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ABSTRACT

The Country Education Project in Victoria, Australia, tested the use of two-way radios to bring educational resources to isolated children studying correspondence courses in small rural high schools and to increase interaction among rural schools. Eight rural Victoria schools and the Secondary Correspondence School in Melbourne used two-way high-frequency short wave radio transceivers for 18 months. Data were collected from log books, observation, interviews, and questionnaires completed by 11 rural teachers, 22 Correspondence School teacher/supervisors, and 38 students. The Correspondence School teachers used the system an average of 25-30 times per month for curriculum meetings and tutorial sessions averaging 15-30 minutes in length. The subjects taught most frequently by radio were French, legal studies, art, politics, and Italian. Students used the system for formal subject meetings and for informal socializing. Rural teachers sometimes used the radios for meetings with neighboring schools. All users were enthusiastic about the radio system and felt it improved subject understanding. Although it increased their workload, teachers felt the system allowed more in-depth treatment of some subjects and easier advisement, motivation, and diagnostic and remedial work. Respondents noted problems with reception, scheduling, and the lack of accompanying visual information, but most participating schools have purchased the cost effective equipment. (SB)

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Ian R. Conboy

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RC 014503

AN EVALUATION OF A HIGH FREQUENCY SHORT WAVE, TWO-WAY RADIO TRIAL

MALLEE PROJECT LOG BOOK

Date	Time	Name of Person(s) using equipment	Name(s) of Person(s) contacted	Length of Contact	Receive Signal Strength	Clarity of Speech	Remarks (Subject matter, effectiveness, level of performance, if any problems, general satisfaction)
12/9	10:00	H. Rabinovich called at home	Corryong H.S.	45'	5	5	1 week lesson year 10 for about 10 min quarter
13/4	12:00	B. Young T. Land	Bealworth H.S.	30'	5	5	1 week lesson year 10 for about 10 min quarter
14-9	9:30	S. Vayner	Bealworth H.S.	35'	4	7	1 week lesson year 10 for about 10 min quarter
15/9	11:00	S. Roberts	Beechworth H.S.	35'	4	7	1 week lesson year 10 for about 10 min quarter
15/9	2:00	J. Burcher	Beechworth H.S.	35'	4	7	1 week lesson year 10 for about 10 min quarter
15/9	3:00	S. Bishup	Beechworth H.S.	35'	4	7	1 week lesson year 10 for about 10 min quarter
15/9	10:00	J. Zeeboorger	Beechworth H.S.	35'	4	7	1 week lesson year 10 for about 10 min quarter
15/9	11:20	Q. Donovan	Beechworth H.S.	35'	4	7	1 week lesson year 10 for about 10 min quarter
15/9	9:25	H. Rabinovich	Beechworth H.S.	35'	4	7	1 week lesson year 10 for about 10 min quarter
15/9	10:00	A. Rabinovich	Beechworth H.S.	35'	4	7	1 week lesson year 10 for about 10 min quarter
15/9	12:00	B. Young	Beechworth H.S.	35'	4	7	1 week lesson year 10 for about 10 min quarter
15/9	9:30	T. Land	Beechworth H.S.	35'	4	7	1 week lesson year 10 for about 10 min quarter
15/9	11:00	S. Vayner	Beechworth H.S.	35'	4	7	1 week lesson year 10 for about 10 min quarter
15/9	2:00	S. Roberts	Beechworth H.S.	35'	4	7	1 week lesson year 10 for about 10 min quarter
15/9	2:55	S. Roberts	Beechworth H.S.	35'	4	7	1 week lesson year 10 for about 10 min quarter
15/9	11:35	S. Roberts	Beechworth H.S.	35'	4	7	1 week lesson year 10 for about 10 min quarter
15/9	12:00	S. Roberts	Beechworth H.S.	35'	4	7	1 week lesson year 10 for about 10 min quarter
15/9	2:00	S. Roberts	Beechworth H.S.	35'	4	7	1 week lesson year 10 for about 10 min quarter
15/9	2:50	S. Roberts	Beechworth H.S.	35'	4	7	1 week lesson year 10 for about 10 min quarter

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Two-way Radio in Schools
(or, The Loneliness of The Long Distance Learner)
An Evaluation of a High Frequency Short Wave, Two-way Radio Trial.

Ian Conboy
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REPORT PREPARED FOR THE VICTORIAN COUNTRY EDUCATION PROJECT
OCTOBER 1983

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Cover design- The cover consists of a page taken from the Correspondence School log book and was designed by Hans Wittenberg of the Educational Technology Unit.

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SUMMARY

The Country Education Project Two-way Radio trials in the North-east and the North-west of Victoria are the second of two trials which the C.E.P. have undertaken to bring educational resources to isolated children studying in small rural high schools. Eight rural secondary schools and the Secondary Correspondence School located in Melbourne were given two-way high frequency short wave radio transceivers for eighteen months. The transceivers enabled the rural schools to communicate with each other and correspondence students to communicate with their teacher/supervisors at the Correspondence School. Unlike the various Schools of the Air where the radios are placed in individual homesteads, in this trial, they were installed in schools and used to supplement the printed notes of the Victorian Correspondence School.

Data for the evaluation was collected from logbooks, teacher and student questionnaires and interviews, and a small number of sessions were observed.

The system was used between twenty-five and thirty times a month by the Correspondence School teacher/supervisors. These staff were generally very enthusiastic about the immediacy and speed of response provided by the two-way radio system. Twenty-four teacher/supervisors trialled the two-way radio and used it for a broad cross-section of curriculum subjects. Virtually all of the students who used the system in conjunction with the Correspondence School were also enthusiastic about its value. The two-way radio was also used by teachers in the eight schools for curriculum meetings and Level 12 students in the schools organised several subject-based meetings using the device. In general, the sound quality was acceptable although there was some deterioration during Summer. Most of the schools have decided to purchase the equipment used in the trial.

ACKNOWLEDGEMENTS

The Principals, teachers and students in the eight schools and the Principal and teacher/supervisors of the Correspondence School have been instrumental in providing the data to enable the evaluation to be completed. Dr Peter White of Latrobe University's Centre for Educational Communication and Media Studies raised a number of issues which he felt should be included in the report and suggested several modifications to the presentation of the document.

Chapter 1. Introduction

1.1 Preamble

Australia, because of its vast tracts of inhospitable desert and semi-desert has virtually pioneered the use of high frequency shortwave two-way radio in education. Farmers are often more than a days drive from their nearest neighbour and consequently are not connected to a power grid. In the physically larger Australian states of Western Australia, Queensland and New South Wales, these communication links are utilised by the Royal Flying Doctor Service. Because the requirement for this service is intermittent, the two-way radio system is used for education by the various Schools of the Air when it is not required for medical emergencies. However, in the smaller states of Tasmania and Victoria, no attempt has been made to use interactive high frequency two-way radio in education and Victoria is the only mainland Australian state today without a School of the Air.

This report is an evaluation of two Country Education Project pilot projects involving eight small rural secondary schools located in the North-east and the North-west of Victoria and the Correspondence School in Melbourne. These schools are using two-way radio transceivers to assist secondary students to overcome some of the educational disadvantages caused by rural isolation. As well as providing insights into the technology necessary to support the implementation of the two-way radio device into small rural high schools, the pilot projects provide an opportunity to observe an institution such as the Correspondence School which is moving from offering a print-based type of distance education to one using multi-media to distribute curriculum materials and information.

1.2 The Country Education Project.(C.E.P.)

In Victoria, the Country Areas program of the Commonwealth Schools Commission is known as the Country Education Project. The C.E.P. funds local educational programs which are designed to identify and overcome educational disadvantage to students caused by rural isolation. One of the unique features of the C.E.P. is its method of operation at the grass roots level. Rather than impose solutions to local problems from a central authority, the C.E.P. seeks to encourage schools to use local initiative through their appropriate area committees to solve their difficulties. The C.E.P. central organization initiates educational solutions to demonstrated educational needs and also provides a co-ordinating and revenue dispensing role. It is

therefore very responsive to local needs in the country. Both teachers and students working in small country high schools believe that their inability to take part in a wider exchange of educational ideas and their isolation from the mainstream academic and intellectual thinking in Melbourne are their main educational disadvantages. Students cannot gain an insight into the broad spectrum of other student ability with only three or four students in their class. This insight can only come when they discuss their study with other students and are stimulated and motivated by them.

1.3 The North-east and North-west Victorian Pilot Project

1.3.1 Introduction

The following secondary schools in the North-west of Victoria: Hopetoun, Manangatang, Murrayville, Ouyen and Sea Lake received two-way radio transceivers in mid 1982 and in September 1982, Beechworth, Corryong and Mt Beauty High Schools as well as the Correspondence School in Melbourne received their transceivers. An experimental frequency was issued by the Department of Communication and the call sign VZ3PT was adopted for the trials. As with the Country Education Project's previous Charlton Pilot Project, the schools were given no instructions on how to use the radio for educational purposes. (Conboy, 1982) The intention was to install the devices in as natural setting as was possible and to observe the use made of them by the Correspondence School teacher/supervisors, the teachers in the rural schools, and the students.

1.3.2 Aims of the two pilot projects.

The principle aim of the projects although not explicitly stated appeared to be to increase the degree of interaction between:

- (a) country schools with small classes and correspondence students,
- (b) teachers in nearby schools, and
- (c) parents and teachers in country schools and correspondence school teachers

Secondly, to pool resources available in country schools and the correspondence school, and thirdly, to make better use of reasonable cheap communication technology.

A further aim of the North-east section of the trial was an attempt to introduce a visual link to support the audio link. It was hoped that computer graphics tablets could be used as electronic blackboards and their contents transferred between Mount Beauty, Corryong and Beechworth High Schools. (C.E.P. p2-3)

One further aim which emerged during discussions with teachers was to attempt to improve students' perceptions of the Correspondence School.

1.3.3 Implementation

Late in 1981, discussions were held with the schools and it was agreed that the equipment would be supplied to the schools during mid 1982. Mr Geoff Baker, Senior Technical Officer with the Royal Flying Doctor Service at Broken Hill was consulted and agreed to supervise the acquisition and installation of the two-way radios. The transceivers were hired from a Broken Hill supplier on the understanding that the schools would have the option of purchasing them at a nominal price at the completion of the hire period. Mr. Jack Thompson, a Manangatang farmer with a knowledge of short wave radio installation installed the transceivers and aerials in each of the eight schools.

Prior to Term 2, 1982, one meeting and one inservice education day was held for teachers in the North-east and the North-west. On May 26th 1982, eight teachers from the three schools took part in an in-service education program at Beechworth High School. This program consisted of lectures and demonstrations given by Mr Bill Davey and Mr. Arthur Tatnall, two computer consultants with the Victorian Education Department. On 28th April, 1982, an inservice education day for teachers in North-west Victoria was held at Ouyen Shire offices. Mr. John Collins, Assistant Director of the Victorian Council of Adult Education spoke to a number of participating teachers on the dynamics and methodology of group interaction at a distance and some of the difficulties of interpreting what people are saying when they cannot be seen. In the session, he distributed a paper to the participants which stressed the need for careful planning and suggested that educational problems rather than technical problems are likely to cause the method to fail. (Council of Adult Education. 1982) During the afternoon, Ms. Helen Pollard, Principal of the Broken Hill School of the Air conducted two lessons with her regular classes

of children from the Shire Office to outback stations hundreds of miles away. She also spoke to the teachers about the techniques of instruction by radio used by the Broken Hill School of the Air. Participants were divided into two groups, and then sent with radios to two separate locations and asked to communicate a series of simple tasks to each other. While the inservice day was not an indepth study of all the techniques necessary to use the radio effectively to teach, it did give the teachers a very effective insight into the advantages and some of the problems associated with two-way radio instruction. Unfortunately, only Charles Bram and Graham Clay of the Correspondence School were able to attend the Ouyen inservice education day. Charles Bram, the co-ordinator of the project at the Correspondence School visited the school to advise teachers and students about the operation of the radio.



Figure 1. Ms. Helen Pollard, Principal of the Broken Hill School of the Air conducting one of her classes from the Ouyen Shire office. (Photo- The Educational Magazine, Education Department of Victoria)



Figure 2. Eddie Pierce, Economics teacher from Sea Lake High School completing one of the exercises during the In-service day at Ouyen.

Chapter 2 Evaluation Methodology.

2.1 Introduction.

Because of the small number of students involved in the two projects, a project evaluation structured on a formal experimental design was not appropriate. In addition, some variables such as the amount of support given by individual schools to students taking correspondence subjects are difficult to quantify. In some schools, Correspondence students virtually work in isolation while in other schools such as Murrayville High School, students have access to a teacher who has some tertiary qualifications in the subject. In other schools, a timetable clash may mean that a student is unable to study the subject with the allotted teacher but the student will have access to the teacher's advice. Becker (1978) has been critical of experimental studies of new technology which are not sensitive to the dynamics of the setting, nor the intention of the learners.

Therefore, a number of techniques were used to collect the data necessary for this evaluation. The evaluation model is closest to Parlett and Hamilton's illuminative evaluation. (Parlett and Hamilton, 1977) While the pilot project was evaluated in terms of its implicit objectives, interpretations and descriptions within the total context of the innovation were also undertaken and evidence of any unanticipated outcomes was actively sought. As in the evaluation of the Charlton Pilot Project, (Conboy, 1982) one theme within this broad structure was to focus on questions which would be relevant to decision makers. Teacher participants from the rural schools were asked to identify the key decision makers and questions to be answered by the evaluation. This was based on a procedure outlined by Patton (1978). He suggested that a worthwhile evaluation requires an ongoing commitment from the participants and they have to be involved in determining key attributes of the evaluation. Accordingly, teacher participants from the rural schools were given the opportunity to determine questions and decide the evidence which would indicate success or failure of the high frequency short wave two-way radio system. Szymanski's evaluation of Tremerealeau County Kellogg Project provided a useful summary of the main educational concerns in a similar educational communications trial. (Szymanski, 1981, p.13)

2.2 The Educational Setting for the Trial.

2.2.1 The institutions.

2.2.1.1 The rural schools.

The five schools in the north-west of Victoria are in the wheat growing area of the state known as the Mallee. The area is flat to gently undulating and takes its name from the low scrubby vegetation characteristic of the area. Because of the trend to larger more productive machines, farms are increasing in acreage and the small towns are steadily losing population. In contrast, the three schools in the north-east are in the mountainous third of the state. Mixed farming, forestry and tourism support relatively stable numbers of approximately 2,000 people in each town. Table 1 provides a summary of the numbers of staff, total students, students in Level 12, and the students studying subjects by correspondence in each of the schools.

TABLE 1
Numbers of Staff and Students in the Schools

	Number of Staff	Number of Students	Level 12 Students	Correspondence Students
North-west Victoria				
Hopetoun High	26	212	12	-
Manangatang Cons.	14	202	1	2
Murrayville High	18	87	6	6
Ouyen High	30	276	23	
Sea Lake High	25	245	15	-
North-east Victoria				
Beechworth High	26	220	11	4
Corryong High	38	403	24	4
Mount Beauty High	24	199	14	6
Correspondence School (Secondary)	107	3,800	1,500	-

All the rural schools with the exception of Corryong High School have enrolments between 90 and 280 students. Corryong High School, because of its

isolated location and larger student population offers seventeen subjects at Level 12. To varying degrees all these schools have difficulty offering and maintaining a broad range of subjects for their students at Level 12. They do not have specialised staff and because of their remoteness, inexperienced teachers constitute a higher percentage of their staff than they do in metropolitan high schools. Staff turnover is higher than in metropolitan schools and student demand for subjects can vary considerably from year to year. The lack of support services such as speech therapists, counselling and guidance specialists and social workers is more critical in these schools and because of their remoteness, curriculum consultants can only make one or two visits a year. (Remote High Schools Study, 1982) However, in some respects, the staff and students of some of these schools are privileged relative to their metropolitan counterparts. For example, Murrayville High School operates an FM radio station as an integral part of the school's curriculum. (Bartlett, 1982)

2.2.1.2 The Correspondence School.

The Secondary Correspondence School provides instruction to students who are enrolled in a school or who are home-based students. The school-based correspondence students may be attending a small school which is unable to offer the complete curriculum or there are timetable difficulties. The home-based students may be mature students in full time employment or they may be unable to attend a school for reasons such as poor health. The Correspondence School has mainly relied on print materials for instruction and its course notes are held in high regard by Victorian teachers. Printed notes are supplemented in some subjects by audio tapes and correspondence students maybe required to attend the Correspondence School for up to three seminars in some subjects. Some Correspondence teacher/supervisors also visit their students during the year.

The current trial is not the Correspondence School's first experience with short wave high frequency radio. In 1954, in conjunction with the Royal Melbourne Institute of Technology, the Correspondence School commenced short-wave transmissions of educational broadcasts to home-based students in the Melbourne metropolitan area. However, these transmissions were only one-way broadcasts and the secondary broadcasts ceased in 1976 because the

Correspondence School was now concentrating more on cassettes and tapes.
 (Coulthurst, The Sun News Pictorial, 20th August, 1953, page 9)

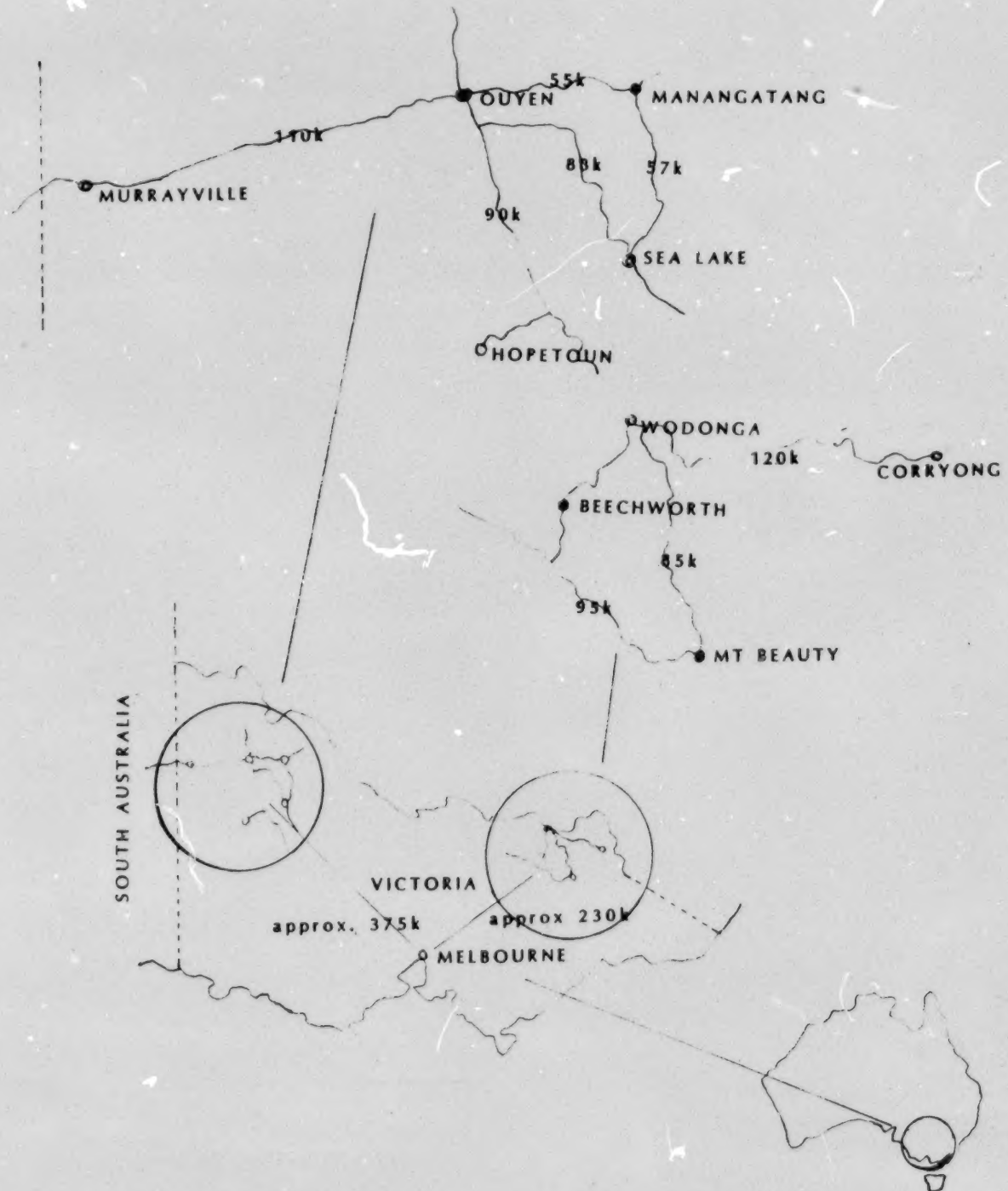


Figure Location of the two areas in Victoria.

2.2.2 The teachers and teacher/supervisors participating in the pilot project.

In order to distinguish between the teaching staff in the rural schools and those working in the Correspondence school, the latter have been referred to as teacher/supervisors throughout this report. Eleven rural teachers were interviewed during the evaluation and information in the form of either an interview and, or questionnaire response was received from twenty-two teacher/supervisors at the Correspondence School. Only one of the teacher/supervisors who responded to the questionnaire indicated an unfavourable attitude towards devices such as two-way radio. (Appendix D.) The teacher/supervisors are relatively experienced. Only four have less than four years teaching experience. In terms of correspondence education, they were more inexperienced with eight respondents with less than four years experience in the Correspondence School.

2.2.3 The students participating in the pilot project.

Thirty-eight students provided information to assist the evaluation. Twenty of the students were using the equipment for informal Level 12 subject discussions and eighteen students were using the two-way radio to contact their teacher/supervisors at the Correspondence School. Fourteen of the eighteen students were in Level 12, two were in Level 10, and there was one student in each of Levels 9 and 10. (Appendix A)

2.3 Procedures for gathering data

2.3.1 Logbook.

Logbooks were printed and distributed to the five North-east schools in July, 1982 and to the three North-east schools in February, 1983. (Appendix B) The users of the two-way radio were asked to record the date and time they used the radio, the persons contacted, the length of contact, the strength of the signal received, the clarity of speech and any general remarks which may be valuable to the evaluation. The signal strength was rated on a 1-5 scale with 5 representing the strongest rating, and the speech clarity was rated on a 0-9 rating with 9 representing the clearest speech. Users were asked to record any interference from other people breaking in on the frequency allocated for the trial.

2.3.2 Questionnaires designed to survey teacher and student opinion.

The questions on the student questionnaire dealt with the following aspects of the use of the two-way radio system:

The effect of the use of the two-way radio on the students' knowledge.	Questions 2 and 16.
The ease of use of the two-way radio.	Questions 3,4,6,7,8 and 14
The effect of not seeing the other communicator.	Questions 9, 10 and 12.
The effect of the audio contact on students' attitudes towards the Correspondence School.	Question 5.
The value of the two-way radio relative to other types of teaching.	Questions 11, 13,25,26, and 27.
The value of the additional social contact.	Question 15.
Effect of the two-way radio on Correspondence School enrolments.	Question 17 and 18.
The value of specific types of audio contact	Questions 19, 20, 21, 22, 23 and 24.

(Appendix C)

The questionnaires were completed by thirty-eight students when the evaluator visited the schools in Term 2, 1983. Most of the questions were five point Likert type scales which required the students to indicate their response to a statement by marking a number on the form. Although the questionnaire was designed specifically for students who were using the two-way radio for correspondence lessons, eighteen other students who were using the radio for informal Level 12 subject meetings also completed the questionnaire. They were instructed to disregard some of the questions specifically designed for correspondence students and this accounts for the number of students who omitted to respond to some questions.

The questions on the Correspondence School teacher/supervisor questionnaire dealt with the following:

Attributes of the respondent.
 Supervision of student learning.
 Advising students.
 Directing students towards effective learning activities.
 Importance of audio contact.
 Socialising with students.
 Conferring with students.
 Overseeing student progress.
 Motivation.
 Learning processes.
 Preparation .
 Nature of verbal exchanges.
 Impact of the two-way radio interaction on student learning.
 Advantages and disadvantages of the system.
 General comments.

Questions 1 to 6.
 Questions 7 and 8.
 Question 9.
 Questions 10, 11 and 12.
 Question 13.
 Question 14.
 Question 15.
 Questions 16, 17 and 18.
 Questions 19 and 24.
 Questions 20 to 23.
 Questions 25 and 26.
 Questions 27 to 30.
 Question 31.
 Questions 32 and 33.
 Question 34.

(Appendix D.)

The questionnaire was sent to the twenty-four teacher/supervisors at the Correspondence School on 15th September, 1983 and replies were requested by September 30th. Eighteen replies were received. Virtually all of the questions on the teacher/supervisor questionnaire were open ended questions because of the complexity of the information which was required. Some of the teacher/supervisors only used the two-way radio on two or three occasions and felt unable to answer several questions.

2.3.3 Interviews with Principals, teachers and students.

One visit was made to the schools to interview the Principals, teachers and students who were using the two-way radio and to observe any sessions when the system was being used. The teacher/supervisors of the

Correspondence School were also interviewed once in September, 1983. The Principals were asked about their general reaction to the system, its general impact on the running of their school and its likely impact on the future curriculum offered in their schools. The interviews were informal and no structured question format was followed.

2.3.4 Observation of verbal interaction in some sessions.

Five sessions were observed at the Correspondence School and one session was observed at Murrayville High School. The following aspects of the interaction were observed and recorded on a coding sheet:(Appendix E.)

- The content of the session.

- The number of references made to the printed correspondence materials.

- The direction of message flow.

- The level of spontaneity and the ease of comprehension.

The sessions were coded by the evaluator and were selected on the basis of convenience. Two Legal Studies sessions were observed and one each of French, Italian and Mathematics.

2.4 Limitations of the Evaluation.

There are several constraints which affect projects of this type and they usually require some qualifications to be made in the interpretation of the data. White (1979) warns of the novelty effect which might generate more cooperation from participants than could be expected if the device became a permanent facility in Victorian schools. However, in these two projects, the newness of the technology does not appear to have had a marked effect. Teachers in the eight schools have not used the device many times and while some of the Level 12 students have been enthusiastic users, they seem motivated by the contact with other students rather than the novelty of the equipment. Teacher/supervisors in the Correspondence School appear to be motivated more by the value of gaining feedback from their students and the personalisation of instruction rather than the newness of the technology. The frequency of use might be expected to increase over time as the teachers in the schools become more familiar with its operation.

Johansen (1976) has warned that the initial uses of teleconferencing systems often serve as a poor guide for future use. It is likely that alternative uses for the communication system will emerge over time particularly if the necessary planning and structures are implemented in the schools.

The distance of the schools from Melbourne and their dispersion meant that only one visit could be made to the schools. The cooperative attitude of Principals, staff and students meant that this visit was of considerable value. However, it also meant that routine data recording such as the completion of the logbook could not be closely supervised. In some instances, the records were not completed accurately.

Shortage of time is a constant constraint particularly in relation to activities such as the coding of sessions using the radio. This form of data collection can also create an interaction between the observer and the participant. In one instance, a teacher/supervisor was obviously concerned about being observed using the two-way radio.

A further constraint was the evaluator's lack of specific knowledge about the operations of the Correspondence School. This meant that the questionnaire addressed to the teacher/supervisors was longer and contained more open-ended questions than is desirable.

Most of these constraints are inevitable and while they probably do not detract from the main content of the report, care must be taken in interpreting the tables.

Chapter 3. Literature Review.

Because the two trials involved the eight schools and the Correspondence School in using high frequency shortwave two-way radio to educate secondary students in small remote rural schools, several research areas were investigated. First, the literature related to distance education was investigated to provide a theoretical basis for the evaluation study. Second, because the audio contact provided by the two-way radio is a form of teleconference, the literature on educational teleconferencing was previewed to provide a framework for the content of sessions using the two-way radio and for the educational implications of audio teleconferencing. Finally, the literature on the educational use of two-way radio was searched to find examples of evaluation studies.

3.1 Literature relevant to distance education.

Although the literature on distance education is mainly directed towards higher education, some of the observations and conclusions are relevant to this evaluation study. Keegan's (1982) work is particularly valuable in defining distance education and differentiating it from face-to-face instruction. He suggested that distance education was a generic term which encompasses correspondence education and study, home study, external studies and distance teaching or study. The separation of teacher and learner, the influence of some educational organisation which distinguishes it from private study, the use of technical media, the provision of two-way communication so that the student may benefit from or initiate dialogue, the teaching of mainly individuals or small groups with some occasional meetings, and what he calls, the elements of a more industrialised form of education such as job scheduling, postal and media despatch are the main characteristics of distance education. Although Baath (1981) questions whether all examples of distance education can be characterised as industrialised and, "the possibility of occasional meetings for both didactic and socialization purposes" the Keegan paper does give a basis for assessing the Victorian Correspondence School's place in distance education. On the basis of the above six characteristics, the Correspondence School is a distance education provider for primary and secondary Victorian school

children. Paine (1982) quoted Smith's Broady lecture delivered in Vancouver where he claimed that distance education implies a student-centred approach to learning where the learning is designed to offer as much support to the target student population as resources will allow. This is reiterated by Penberthy (1982) when he makes a plea to preserve the 'personal touch' of correspondence education.

Learning at a distance has become increasingly common as the growth in communication technology has facilitated the transition from print orientated correspondence education to distance education where some attempt is made to provide for the verbal interaction which is characteristic of face-to-face instruction. Coldeway (1982) summarised the main areas of research in distance education as course completion rates, the reaction of students, the methodology of correspondence study, student achievement and the comparisons of correspondence instruction with other instruction methods. However, the level and quality of research has been disappointing and he attributes this to the lack of a clear paradigm for research. Most research in distance education has been an attempt to find answers to problems which are institution specific and it has rarely been generalizable.

Athabasca University in Canada, in a series of studies, attempted to bridge the gap between the need for practical information and the desire to contribute to a comprehensive theoretical framework. These studies are based on an exploration of three areas. First, learner management models of which Keller's Personalised System of Instruction (P.S.I.) is the most important. Within this context, the Athabasca University studies consider tutoring, pacing, completion ratios, and face-to-face contact. Second, the studies considered research on learner treatment and in particular, Cronbach and Snow's (1977) work on learner X treatment interaction. Four variables are identified. First learner characteristics, Second, course structure and design. Third, treatment effect, and finally, learner performance. Several interactions between these four variables are considered. Finally, some specific problems of the university such as the skills necessary for telephone tutoring are considered. Coldeway's paper is helpful because it provides a theoretical structure for planning research in this field and it outlines some previous research. The current evaluation study is an investigation of the effectiveness of a particular treatment in distance

education, the use of two-way radio.

Apart from providing a theoretical structure for research, distance education literature provides some insights into specific issues of some relevance to the current evaluation. Cropley and Kahl (1983) examined some of the psychological considerations of distance education. They contrast distance education with face-to-face teaching on the following core dimensions of teaching: organisation of learning, motivation, learning processes, communication processes, didactic activities and materials, and evaluation and feedback. In relation to motivation, Cropley and Kahl suggest that while internal motivation is a highly desirable thing in face-to-face education, it is a necessary precondition in distance education. In relation to learning processes, the authors distinguish only three types of learning, stimulus-response learning, learning by imitation, and learning by identification. Learning by imitation relates mainly to values and attitudes and it is in this area that the two-way radio may have an impact on the learning of students. The communication used in distance education is usually heavily structured, formal and largely impersonal. The radio, as well as offering another communication channel to the students, increases the volume of communication and makes the contact between them and the Correspondence school more personal. Distance education didactic activities tend to be highly structured, formal and inflexible. This is one of their main strengths and weaknesses. The more immediate communication provided by the two-way radio may inject some greater flexibility into the didactic procedures. Finally, in relation to evaluation and feedback, the more immediate communication provided by the radio should have its greater impact on students in the feedback area. By giving students the ability to question their teacher/supervisors at the Correspondence School and in turn, by giving the supervisors the means to question their students each week, both groups should be able to make evaluations of their own progress and obtain valuable feedback.

3.2 Literature relevant to educational teleconferencing.

The literature on educational teleconferencing and the use of the telephone system in particular, is quite extensive. Parker (1980) provided a historical summary of the use of the telephone for education and identified

five main modes. These are telelecture, teleteaching, teletutoring, telephone-based instruction and telewriting. These functional categories have been used as a basis for a previous evaluation study by Conboy (1982). Parker has also drawn attention to two papers by Garfinkle (1976) and Uslan (1976) where two-way radio was used to teach Chinese language and geographic and related physical science concepts to pre-tertiary groups. Hugdahl (1978) has indicated that one of the strong points of the telephone teleconference system used at the University of Wisconsin is its ability to bring music instruction to a widely dispersed audience. Monson (1978) has published a useful guide to improving teleconferencing which stresses the importance of humanising, participation, message style and feedback to the success of the interaction. She has also identified the following five valuable items of content which are useful to students: giving and receiving information, asking questions, exchanging opinions, problem solving, and generating ideas. She has also identified the areas of sensitive bargaining and getting to know someone as being the least satisfactory functions of the telephone teleconference system. Much of the information related to teleconferencing is also applicable to audio interaction using two-way radio. Although two-way radio is more structured than some forms of teleconferencing, communicators using two-way radio use many of the same techniques as do communicators using other forms of teleconferencing. Potter (1981) in a discussion of the Canadian experiences with satellite based distance education stressed the importance of communication skills in the successful delivery of distance education delivered by satellite. He outlined six requirements for successful communication and while he was concerned with the satellite distribution of instruction, the techniques are not dissimilar to those of audio conferencing with two-way radio.

3.3 Literature relevant to the use of two-way radio in education.

Most of the literature related to the use of two-way radio in education is descriptive. Richmond (1980) has described the use of two-way radio to teach German. Dermody (1975) described the Katherine School of the Air and Pollard (1981) has documented the approaches used by the Broken Hill School of the Air. Brown (1979) has discussed the two-way radio Schools of the Air in sparsely populated areas of Western Australia as part of an analysis of

the educational provisions in that Australian state and the operations of the Broken Hill School of the Air have been well documented. (N.S.W. Publications Branch 1978, McMillan 1978). The N.S.W. Publications Branch claimed that perhaps the greatest achievement of the radio in social education has been the development of self-confidence amongst children, who because of their extreme isolation, are normally very shy. Children who may be many hundreds of miles from each other are given a corporate identity through their own school and their parents meet each month on the radio for the School of the Air Parents and Citizens' Association meeting. Varley (1979) in an evaluation of educational provisions for isolated children enrolled with the Primary Correspondence School in Queensland discussed the service provided by the Schools of the Air. Madigan (1982) also provided some insights into the use of two-way radio at the Carnarvon School of the Air in his description of a project to use video tapes to supplement the education of isolated homestead children in Western Australia. A recent study of the potential of satellite to provide improved communication for isolated students in Queensland included an analytical assessment of the technical quality of the two-way radio used by the Mt Isa School of the Air. (Kett, Davies and Gillam, 1983, p.26) The study concluded that while the radio links were reasonably clear for teacher to student communications, they tended to be much poorer for student to teacher communications.

While the studies referred to above are informative, in general, they provide an inadequate basis for an educational evaluation of the impact of two-way radio on instruction and learning. Very little information appears to exist about the physical constraints on communication of the 'press to speak' kind of device. Turok (1975) pointed out that the Open University rejected this type of device in favour of two-way open channel equipment for its teleconference tutorials.

The literature on distance education has provided a framework to locate this evaluation in existing research. It is an evaluation of the effectiveness of a particular treatment in distance education. The literature on teleconferencing has provided insights into the components of an effective interaction using audio teleconferencing devices and the literature on two-way radio has provided some insights into the use of this communication device throughout the world. However, all three areas have

yielded few evaluation studies. At best, they have provided some components which can be integrated into a total evaluation design.

Chapter 4. Frequency and Type of use of the System.

4.1 Functional uses of the two-way radio.

The following analysis is based on the following functional uses of the two-way radio in the two pilot projects:

Informal student contact with other students.

Level 12 students from Hopetoun, Murrayville, Sea Lake have taken part in several lunch time discussions using the two-way radio. Occasionally, Ouyen and Mount Beauty students have also joined in these discussions. These sessions are arranged by the students themselves and are based on subject groupings. Students studying English, Economics, Chemistry, Legal Studies and Biology have participated in this activity.

Student contact with the Correspondence School.

Twenty-eight students from seven of the schools have had regular contact with their supervisors at the Correspondence School. The Ouyen High School students could not take part in this use of the system because of interference from the school's loud-speaking system with the two-way radio.

Teacher contact with other teachers.

Teachers of Computer Studies have used the two-way radio for meetings, several Principals have held brief meetings, and teachers in the North-east used the system in the latter part of 1982 for arranging the 1983 system use. However, the teachers in the eight schools have not used the system for linking small classes together for joint instruction.

As well as the above three uses, students of Sea Lake, Hopetoun, Mañangatang, Murrayville and occasionally Mt Beauty take part in a pre-school session from 8.30am to 9.00am to discuss future student meetings, test the quality of the reception, and socialise with each other.

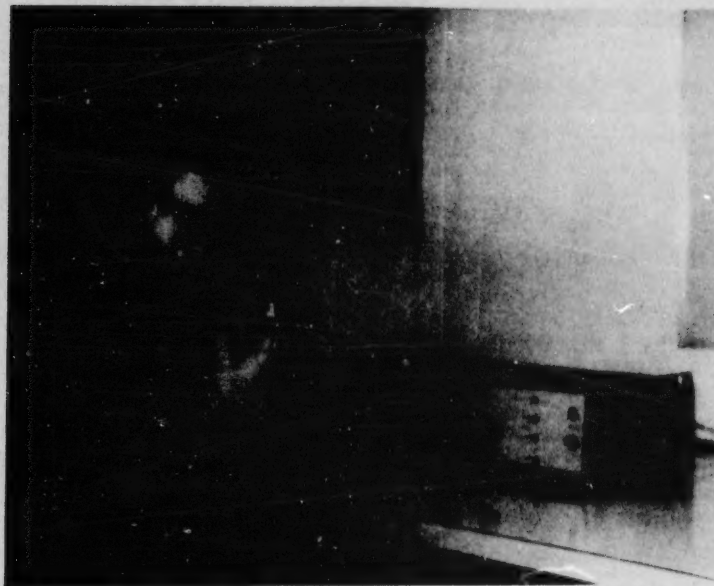


Figure 4. Beth Young, teacher/supervisor of Italian at the Correspondence School using the two-way radio to teach a student at Manangatang Consolidated School.

4.2 Type of use of the two-way radio system.

The type of use that the schools have made of the two-way radio system is outlined in Table 2 below.

TABLE 2.
Type of Use of the Two-way Radio System.

	Student contact with other students		Teacher contact with other teachers		Student contact with the Correspondence School	
	No of sessions	Mean length in minutes	No of sessions	Mean length in minutes	No of sessions	Mean length in minutes
1982						
July	26	15	7	40	-	-
August	8	16	2	45	-	-
September	2	10	19	12	3	10
October	1	-	9	28	8	20
November	1	10	7	25	3	30
1983						
February	-	-	2	25	1	10
March	6	22	5	28	8	10
April	5	21	1	5	12	17
May	-	-	1	7	23	12
June	-	-	-	-	39	14
July	-	-	-	-	40	17
August	-	-	-	-	39	14
September	-	-	-	-	35	17

Discussion.

The pattern of student contact with other students suggests a novelty effect but care must be taken in interpreting these statistics since some of the student use of the system has not been recorded. The teacher contact with other teachers also indicates a decline in use of the system in 1983 but these statistics are also probably understated. During 1983, the use of the system by the Correspondence School has grown steadily and although these statistics may be slightly understated, they probably reflect a relatively accurate indication of their use.

4.3 School use of the two-way radio system.

The type of use each school has made of the two-way radio system is outlined in Table 3 below.

TABLE 3.
Type of Use of the Two-way Radio System by School.

	Student contact with other students		Teacher contact with other teachers		Student contact with the Correspondence School	
	No of sessions	Mean length in minutes	No of sessions	Mean length in minutes	No of sessions	Mean length in minutes
North-west Victoria						
Hopetoun High School	-	-	-	-	-	-
Manangatang						
Consolidated School	-	-	-	-	8	13
Murrayville High						
School	5	27	11	33	19	18
Ouyen High School	30	26	8	31	4	24
Sea Lake High School	8	24	23	22	4	12
North-east Victoria						
Beechworth High						
School	-	-	4	7	18	19
Corryong High School	3	15	5	42	18	20
Mt. Beauty High School	3	23	2	10	39	14
Total and mean length	49	23min.	53	29min.	110	17min.

Discussion.

Hopetoun High School's does not have any students taking correspondence courses in 1983 and although Paul Edwards, a Level 12 student at the school has been largely responsible for arranging a number of useful Level 12 student meetings, the logbook has not been completed. The one correspondence student from Sea Lake High School has had a serious illness and has spent long periods away from the school. Mt Beauty, Corryong, Beechworth and Murrayville High Schools are the most frequent users of the system with the Correspondence School and this is a reflection of the student numbers in those schools taking correspondence subjects and the enthusiasm of their

Correspondence School teacher/supervisors.

4.4 The Correspondence School use of the two-way radio system.

The schools which have used the system in conjunction with the Correspondence School are outlined in Table 4 below.

TABLE 4.
Correspondence School Use of the Two-way Radio System by School.

School	Frequency	Length of Session in Minutes
North-west		
Hopetoun High School	-	-
Manangatang "	8	102
Murrayville "	19	347
Ouyen "	1	20
Sea Lake "	4	50
North-east		
Beechworth "	19	483
Corryong "	18	347
Mt Beauty "	39	551

The subject areas which have been taught by Correspondence School staff using the two-way radio system are summarised in Table 5 below.

TABLE 5.
Correspondence School Use of the Two-way Radio System by Subject.

Subject	Frequency	Length of Sessions in Minutes.
Accounting	7	51
Art	17	148
Economics	1	30
English	1	10
French	31	606
Geography	2	12
History	4	65
Indonesian	1	20
Italian	11	165
Legal Studies	24	620
Needlecraft	2	40
Politics	15	416
Science	3	21

Discussion.

The frequency of individual school use and the total length of their sessions is mainly due to the numbers of students requiring correspondence lessons and the range of subjects required. The low use of the system by Ouyen High School is because of the interference of the two-way radio with their school public address system. The fact that this problem has continued for so long highlights the difficulty of administering trials in remote rural areas and some difficulty with obtaining servicing for this type of equipment. Correspondence School teacher/supervisors representative of all the subject disciplines listed in Table 5 expressed enthusiasm for the system and the difference in frequency and aggregate time for each subject is due to student numbers, teacher/supervisor numbers using the system in each discipline, and the type of use.

Table 6 provides a summary of the frequency of Correspondence School use of the two-way radio system with individual students and more than one student.

TABLE 6.
Correspondence School Use of the Two-way Radio System
by Size of Class Unit.

	Approximate Number of Sessions	
	Multiple Student Use (more than one student)	Single Student Use
All subjects	71	91

Discussion.

The predominance of single student use is largely a reflection of the number of correspondence students in the eight schools. In some subjects such as Art, two students in two schools were linked together for a session with their teacher/supervisor. However there is the difficulty of different school timetables and also the question of what is the most effective group

size to allow sufficient interaction between each student and their teacher/supervisors. Both Ted Land and Alick Ahern of the Correspondence School believe that five students is the most effective number for a group.



Figure 5 Janet Whitsed and Denise Walton, two Level 12 students of Corryong High School using the two-way radio to speak to their Correspondence School Art teacher/supervisor.

Chapter 5 Attitudes Towards the Two-way Radio System and the Levels of Acceptance of the System.

Attitudes towards the two-way radio system were sought from Principals, Correspondence School teacher/supervisors, a small number of teachers in the schools, and the students who have used the radio in the schools.

5.1 Principals' attitudes towards the system.

All of the Principals who were interviewed expressed their strong support for the two-way radio system. They believe that it increases the viability of their schools and improves the quality of education received by students studying in isolated secondary schools. The system does not disrupt the organisation of their schools except at Ouyen High School where there is interference between the radio and the school amplifier system. Jim Nunan Principal of Murrayville High School highlighted the problem for small schools when he said that if a school has less than twenty-three staff it was inevitable that it would require support from the Correspondence School to offer the full curriculum range. He also suggested that there could be an advantage in studying mathematics by radio. When a teacher has to explain mathematics without using visual cues, the steps and procedures must be clearly thought through and presented. Bruce Hotton, Principal of Hopetoun High School felt that the radio contact from the Correspondence School might encourage small schools to continue their options for studying languages in Levels 7 to 10 or to increase them, and Kurt Forrer, Principal of Manangatang Consolidated School considered that the radio would assist teachers to supplement their own knowledge.

5.2 Teacher attitudes towards the system.

The attitudes of the teachers who have used the system are in general, very favourable. The responses are divided into those teachers from the eight schools who have used the system and the teacher/supervisors from the Correspondence School.

5.2.1 Teachers in the eight schools.

Alan Marshall, the Sea Lake High School Computer Studies teacher indicated that the system worked very well for Country Education Project computer group meetings. It is important to set out the agenda prior to the meeting and each participant takes it in turn to comment on an issue. The advantage of the system for a meeting is that the participants have time to think carefully about what they are going to say and they are less likely to stray from the point. However, the system is unsuitable for discussing controversial issues. Nell Evans, the Economics and Accountancy teacher at Murrayville High School who supervises the Legal Studies correspondence students felt that the system was helping the students. He believed there was a definite improvement in student knowledge of Legal Studies and the students were collaborating together more as a unit. This was confirmed when the evaluator observed the five students during a session with their teacher/supervisor. Brian Humphries of Corryong High School questioned the overall lack of rationale for the pilot project but he believed that it was useful for senior French. While Corryong High School has French teachers who can give the Level 12 students conversation practice, the Correspondence School relieves administrative pressure on the school.

5.2.2 Correspondence School teacher/supervisors.

Teacher/supervisor indicated during interview and on their questionnaires their support for the two-way radio system. They identified a number of advantages and disadvantages and these are listed in Table 7 in the order of frequency they were identified in the questionnaire.

TABLE 7.

Advantages and Disadvantages of the Two-way Radio System Identified by the Correspondence School teacher/supervisors in order of frequency.

Advantages.

- i. The immediacy and speed of responses.
- ii. Personal contact with students.
- iii. Oral practice with a foreign language.
- iv. Forces a direct response.
- v. Eliminates misunderstandings.
- vi. Promotes verbal skills
- vii. Provides feedback
- viii. Facilitates motivation.

Disadvantages

- i. Poor reception.
- ii. Different school timetables.
- iii. Involves extra planning time.
- iv. It is only available to a few students.
- v. The students lose some study time.
- vi. The lack of visual capacity.
- vii. The push button mechanism.
- viii. One way conversation.
- ix. Cost.

5.3 Student attitudes towards the system.

5.3.1 Student evaluation of the system.

Virtually all of the students expressed a favourable attitude. Some Level 12 students from Sea lake High School expressed the concern that when they were using the system with other schools to discuss general subject topics, the large numbers and the lack of a chairperson to control the interaction, meant that some students were interrupted during the discussion and this increased their frustration. The Level 12 students at Hopetoun High School suggested that one of the most useful pieces of information was to compare the different treatments of topic options in some subjects. Robin Bowd of Manangatang Consolidated who is studying Italian by correspondence felt that the radio contact with her teacher supervisor at the Correspondence School would make the subject easier to learn. Two of the students who were interviewed indicated that the radio contact was useful but they would prefer to use it when they had specific questions rather than on a regular basis.

Students at Mount Beauty High School were very enthusiastic about the system. Phoebe Irwin and Julie O'Brien were extremely supportive of the system and suggested that the advantage for them was the ability to ask questions directly rather than having to write down the question and send it away and wait two to three weeks for a reply. Writing was too slow and telephone calls were too expensive. It was particularly helpful to find color illustrations of paintings. Often the teacher/supervisor in Melbourne could tell them where to find another illustration of a specific painting. Karen Richardson who is studying both Legal Studies and Art by correspondence felt that she now could not do without the radio contact. Faith Jethcott and Sheralee Wheeler of Corryong High School who are studying French by correspondence felt that the advantage of the radio is that they can now speak French with their teacher/supervisor and have immediate feedback on pronunciation faults. Rex Lucas and John Ladson who are using the radio to study Pure Mathematics by correspondence at Beechworth High School felt that the radio was a big help to them. They said that when they rely solely on correspondence notes, occasionally it is difficult to recall correct mathematical procedures. With the radio, it is much more efficient for the supervisor to take the students through the sequences step-by-step and teach them the correct notation to use.

Student attitudes to various aspects of the high frequency short wave two-way radio system were obtained from the questionnaire and the responses are outlined below. With most of the statements on the questionnaire, the student responses are analysed in three categories. First, the responses are given for all students. Second, for students taking a correspondence course and third, the responses of students taking part in Level 12 discussions. The distinction is made between the type of student use because the use with the Correspondence School is more formal than the Level 12 meetings. Therefore the two groups might be expected to react differently to certain statements.

5.3.2 Student assessment of the ease of using the system.

Some of the students who participated in the Charlton Pilot Project and used Telecom Australia teleconferencing devices expressed concern about the lack of warning when questions were asked over the telephone system. It was anticipated that some of the students taking part in the two-way radio trials would also express some concern about this aspect of the system. The intention of the statements listed in Table 8 is to determine the extent of their discomfort and whether this was sufficient to reject the system.

TABLE 8.
Student Assessment of the Ease of Using the Two-way Radio system on their
Understanding of Topics

Statements	Student Responses to the Nearest Percentage				
	Strongly agree	Agree	Don't know	Disagree	Strongly disagree
	%				
Q. 3. I was able to ask questions and give answers easily during the session.	14	53	28	3	-
Q. 4 I have become more relaxed using the two-way radio as I have gained more experience with it.					
All students	8	19	24	46	3
Correspondence students	5	15	15	60	5
Level 12 discussion group	12	23	35	29	-
Q. 6 The lack of privacy of the two-way radio made me hesitate to speak freely.					
All students	-	34	56	6	3
Correspondence students	-	42	53	5	-
Level 12 discussion group	-	23	62	8	8
Q. 7 The need to constantly finish a statement with 'over' is a serious disadvantage with this technology.					
All students	28	46	21	-	3
Correspondence students	28	43	28	-	-
Level 12 discussion group	25	60	-	-	12
Q. 8 Getting used to this system is quite an effort.					
All students	27	38	19	38	3
Correspondence students		30	10	55	5
Level 12 discussion group	6	47	29	17	-
Q.14 It was sometimes hard to react to things said at the other end because it was hard to interpret what was said.					
All students	8	45	18	29	-

Discussion.

Although the students are able to use the two-way radio easily and the lack of privacy has not inhibited their use of the system, most of them have not become more relaxed with the radio during the trial and this may be because of the relatively persistent and effective questioning technique used by some of the Correspondence School teacher/supervisors. The students who used the system for correspondence lessons have on average, found the system more difficult to adapt to than those who have used it for informal discussions. Three of the Correspondence School students strongly agreed with the statement suggesting that it was sometimes hard to interpret what was said at the other end and this may be because of the level of general atmospheric interference in the vicinity of Melbourne. The greater complexity of the teacher/supervisors' sentences may also contribute to this response.

5.3.3 Student attitude towards the Correspondence School

One of the desirable outcomes which was predicted from the trial was that rural students who studied subjects by correspondence would feel more involvement with the Correspondence School as a result of being able to speak directly with their teacher/supervisors. This is confirmed by their response summarised in Table 9 below.

TABLE 9.
Student Assessment of the Impact of the Two-way Radio system on their Attitudes
Towards the Correspondence School.

Student Responses to the nearest Percentage	
Strongly agree	
Agree	
Don't know	
Disagree	
Strongly disagree	
Q. 2 I now feel more involved with the Correspondence School as a result of using the two-way radio.	
Correspondence students	55 30 10 5

5.3.4 Student attitude towards the social contact through the two-way radio.

One of the desirable outcomes that was predicted for the two-way radio system was that the rural students would obtain considerable benefit and enjoyment from communicating with other students and with the teacher/supervisors at the Correspondence School. Their response to statement 15 is summarised below in Table 10.

TABLE 10.
Student Assessment of the Impact of the Two-way Radio system on their Social Contacts.

Student Responses to the Nearest Percentage	
	Strongly agree
	Agree
	Don't know
	Disagree
	Strongly disagree
Q 15 I consider that the social contact with other teachers and students was valuable.	
All students	32 54 11 - 3

Discussion.

Nearly all of the students valued the two-way radio system for the added social contact they receive when they use it.

5.3.5 Student attitudes towards some of the physical aspects of using the two-way radio.

It was anticipated that students would express some concern over the difficulty of communicating with the two-way radio and the intention of statements 9, 10, 11, and 13 was to determine the extent of this difficulty. Their responses are summarised in Table 11 below.

TABLE 11.
Student Attitudes Towards Some Physical Aspects of Using the Two-way Radio.

		Student Responses to the Nearest Percentage				
		Strongly agree				
		Agree				
		Don't know				
		Disagree				
		Strongly disagree				
		%				
Q. 9	I was sometimes uncertain whether the person at the other end was listening.					
	All students.	3	39	19	39	-
Q.10	When someone at the other end spoke, it was always clear to whom he or she was speaking.					
	All students.	16	26	10	39	8
	Correspondence students	25	30	5	30	10
	Level 12 discussion group	5	22	16	50	5
Q.11	I think that if I could see the supervisor, and see examples of the subject matter, the session would be improved.					
	All students	14	54	29	3	-
Q.13	I think that if we had all been in one room, I would have felt more comfortable.					
	All students	8	19	24	46	3
	Correspondence students	5	16	16	58	5
	Level 12 discussion group	11	22	33	33	-

Discussion

It is hardly surprising that students expressed some concern with this equipment since in most cases, it is never likely to be as satisfactory as a face-to-face situation. At least half the students were uncertain that the person at the other end was listening or to whom they were speaking. It is also significant that there was support for supplementing the audio contact with visual images. Seventeen students disagreed with the statement that they would have been more comfortable in one room and the majority of these were correspondence students. Students appear to feel relatively comfortable with the equipment and although the 'push button' mode of operation is a constraint, it does not appear to seriously reduce the effectiveness of the

communication.

5.3.6 Student assessment of the probable impact of the two-way radio on enrolments and course completion rates.

One of the characteristics of distance education is the high drop-out rates which often occur when students are forced to study in isolation. It was anticipated that the closer contact with the Correspondence School through the two-way radio might encourage more students to attempt subjects by correspondence and induce those already studying subjects by correspondence to continue them. Students were asked to indicate the extent of their agreement with statements 17 and 18. The results are summarised in Table 12 below.

TABLE 12.
Student Assessment of the Impact of the Two-way Radio system on
the probable course completion rates.

Student Responses to the Nearest Percentage					
Strongly agree					
Agree					
Don't know					
Disagree					
Strongly disagree					
%					
Q.17 I think that if two-way radio was available for all correspondence subjects, more students would enrol for them.					
All students	19	39	39	3	-
Q.18 I think that if two-way radio was available for all correspondence subjects, less students would 'drop out' during the year.					
All students	10	37	40	10	3

Discussion.

Generally, students feel that the presence of the two-way radio in their school would encourage students to enrol for correspondence course and to

continue with them. However, Halina Tauman, a Correspondence School Applied Mathematics teacher/Supervisor, who used the two-way radio in 1982 indicated that students do not withdraw from correspondence subjects very frequently. She estimated that the rate would be approximately seven to ten percent. Sometimes they may be advised to discontinue a subject if they are having difficulty with it. Any student who fails to complete a course is a cost to the education system and any innovation which can reduce this is increasing the productivity of education.

5.3.7 Student assessment of the effectiveness of the two-way radio relative to other forms of instruction.

While it was likely that students would not value two-way radio instruction higher than face-to-face instruction, it was anticipated that they might find the combination of the enhanced audio contact and the printed material more effective than learning solely from printed notes. Their responses to statements 25, 26, and 27 are outlined in Table 13 below.

TABLE 13.
Student Assessment of the Effectiveness of the Two-way Radio Relative to Other Forms of Instruction.

		Student Responses to the Nearest Percentage			
		Extremely effective			
		Relatively effective			
		Of some value			
		Relatively			
		ineffective			
		Extremely			
		ineffective			
		%			
Q.25	How effective is two-way radio relative to face-to-face teaching?				
	All students	-	48	48	- 3
Q.26	How effective is the two-way radio relative to face-to-face group student work?				
	All students	-	34	56	6 3
Q.27	How effective is the two-way radio relative to correspondence course learning solely from printed notes?				
	All students	28	35	21	- 3

Discussion.

Students do not rate two way radio as high as face-to-face teaching in effectiveness but it appears to be a significant improvement to correspondence education solely from printed notes.

5.3.8 Student assessment of the value of specific content in the two-way transmission.

It was considered desirable to obtain some assessment from the students of the value of various components of the audio communication with the two-way radio. Their assessments are outlined in Table 14 below.

TABLE 14.
Student Assessment of the Value of Various Components of the
Two-way Transmissions.

	Student Responses to the Nearest Percentage				
	Extremely valuable	Of some value	Undecided	Of little value	Of no value
	%				
Q.19 Obtaining information about your recent performance on class sets.	40	43	13	3	
Q.20 Obtaining advice about new sets.	65	24	10	-	
Q.21 Obtaining general information about the course such as deadlines etc.	38	48	10	-	3
Q.22 Being able to question your supervisor about more difficult aspects of your work	52	24	21	-	-
Q.23 Being questioned by the supervisor.	14	53	28	3	-
Q.24 Being made aware of current developments in my subject area.	41	34	10	10	-

Discussion.

Generally all the components of the two-way radio session are rated highly by the students with the exception of the questioning by the teacher/supervisor. This is probably a reflection of the more stressful situation of being questioned without the benefit of body language to warn of a pending question. Some teacher/supervisors also pursue a relatively

vigorous questioning sequence on the radio as they probe for possible student difficulties.

Chapter 6. Educational implications of the two-way radio system.

6.1 The impact of the system on the level of student achievement.

Because of the small numbers of students involved in the trial, it was not possible to implement an experimental design to determine the educational gain from using the radio. Although there were six students studying Legal Studies by correspondence, one student had access to a specialist Legal Studies teacher while the other five were supervised by an Economics and Accountancy specialist. Other variables which could affect the final performance of each student would make it difficult to attribute any improvement or decline to the radio link. However the Correspondence teacher/supervisors do have very comprehensive records of their students' achievement on assignments and they and their students were questioned about the radio link.

6.1.1 Student Questionnaire responses.

The thirty-eight students who completed questionnaires were asked to indicate their level of agreement with statements 2 and 16 on the student questionnaire. (Appendix C.) Their responses are summarised in Table 15.

TABLE 15.

Student Assessment of the Impact of the Two-way Radio system on their Understanding of Topics

	Student Responses to Nearest Percentage				
	Strongly agree				
	Agree				
	Don't know				
	Disagree				
	Strongly disagree				
Statements					
Q. 2. I have improved my understanding of the subject matter as a result of using the two-way radio to talk to my supervisor					
All student response	18	50	25	7	-
Correspondence student response	21	52	16	10	-
Level 12 discussion group response	12	48	48	-	-
Q.16. The system helped me gain an understanding of difficult ideas much quicker than I would have from written notes.					
All student response	16	32	38	13	-
Correspondence student response	30	40	25	5	-
Level 12 discussion group response	-	53	23	-	-

Discussion.

Most of the students who responded to statement 2 agreed that they had improved their understanding of the subject matter by using the two-way radio. Predictably, less of the students who used the radio to contact other students for a general discussion about their work agreed with statement 16. However there is obviously some uncertainty in the minds of students. Although they feel that the system has improved their understanding of their subjects, they are less certain that using it helps them understand difficult ideas more quickly than from written notes. This response may be due to the Correspondence School's very good print materials and the students' inexperience with the system.

6.1.2 Correspondence School teacher/supervisor assessment of the impact of the two-way radio system on student knowledge.

Thirteen of the teachers indicated that the students had increased their knowledge as a result of using the radio. One response was a qualified 'perhaps' and three did not respond to the question.

6.2 Impact of the two-way radio on the role of the Correspondence School teacher/supervisor.

6.2.1 Impact of the two-way radio on the work schedule of Correspondence School teacher/supervisors, flexibility of instruction, and on existing printed materials.

A correspondence teacher/supervisors work schedule consists of the following:

1. Approximately 12 20-30 minute corrections per day.
2. Writing 29 - 32 model answers per year.
3. Spending time checking and reminding recalcitrant students to return assignments.
4. Clerical work such as the recording of marks.
5. Preparing material for despatch.
6. Conferring with visiting students.

The overall impact of the two-way radio on the work schedule of the teacher/supervisor depends on how the device is used, the subject being taught and the number and diligence of the students who are contacted. Some of the teacher/supervisors prepare a standard face-to-face lesson. Helen Rabinovich structures her sessions in the following manner:

1. General social conversation in French with the introduction of new questions.
2. Phonetic exercises- e.g. practice on one vowel sound.
3. Poetry. Sheets of poems are distributed in advance.
4. Reading from main text or distributed sheets.
5. Development of conversational grammar skills.
6. Individual student questions.

Most of the teacher/supervisors who are frequent and regular users indicated that the two-way radio had added to their work schedule. As well as the time spent on the radio, they had to spend thirty to forty-five minutes planning the type of verbal interaction. This may involve re-reading course material of a current nature, photocopying the student's last assignment, and checking the current sets' questions and answers. Sue Vayner who uses the radio to teach Level 12 General Mathematics indicated that she spends two to three hours prior to the session to choose problems similar to the problems in which the students made mistakes. In general, the Correspondence School teachers' schedule appears to be much more rigid than the schedules of a face-to-face classroom teacher. The latter have the flexibility to do other tasks in a classroom but this opportunity is not available to the correspondence teacher/supervisor. Susan Keck, an art teacher/supervisor indicated that she allocates approximately thirty minutes correction time for each Level 12 student per week and that it is virtually impossible to vary this.

6.2.2 Impact of the two-way radio on the flexibility of instruction.

The correspondence courses are pre-planned twelve months in advance and the information is supplied almost wholly through the printed notes or 'runs'. The two-way radio has no impact on the over-all design of the courses but some of the teacher/supervisors are able to pursue some topics in

greater detail. Alick Ahern and Ted Land who teach Level 12 Legal Studies are able to highlight current events such as significant court cases which have a relevance to the course. Alick Ahern is also able to use the two-way radio to follow-up careers information. While the overall planning of the course is unlikely to change, the work given to individual students can be varied. Stephen Roberts considers that the two-way radio is similar to the telephone but feels that it does give more chance to delve into certain problems. Joady Donovan, an Art teacher/supervisor indicated that after consultation with an individual student, she could send specific information but she did not have the time. Although the radio gives the scope to vary the time allocated to topics, this does not happen in practice because of time constraints.

6.2.3 Impact of the two-way radio on the management of instruction.

6.2.3.1 The ability of Correspondence School teacher/supervisors to advise students using the two-way radio.

Although the teacher/supervisors felt that they could readily advise students using the two-way radio, they also felt that a seminar which provided them with a chance to meet their students was the ideal way of achieving this function.

6.2.3.2 The ability of Correspondence School teacher/supervisors to guide students towards the most efficient learning activities using the two-way radio.

1. Remedial activities.

The teacher/supervisors who responded to Question 10 indicated that the two-way radio provided them with this opportunity if the students required it. Several examples were listed where students were given additional help in answering multiple choice questions, pronunciation of Italian, and the use of the full stop in English. Carol Ford, a Mathematics teacher/supervisor indicated that she can pinpoint problem areas quickly, but the scope for explanation is limited because there is no way of illustrating

what is said.

ii. Arousing student interest.

Only one of the teacher/supervisors who responded to question 11 did not find it easy to arouse student interest. Alick Ahern indicated that initially it was difficult, but through role playing in Legal Studies, he was able to increase the contribution of his students. Carol Ford suggested that her student appeared to be more motivated to send work in on time and to have another try at difficult exercises.

iii. Students' ability to think independently.

Although the majority of the seventeen teacher/supervisors who responded to this question felt that it does encourage independence, two felt that it may hamper it. Alan Gourley felt that the less direct contact a teacher has with his students, the more independent the students are likely to be and Gill Anderson indicated that the system seemed to encourage her student to ask questions too quickly without adequately thinking through the issue. This is probably due to the pressure of the medium to keep talking on the medium. Margaret Ross indicated that she had successfully encouraged one of her students to work more independently.

6.2.3.3 The impact of the two-way radio on socialising and conferring with students.

All the teacher/supervisors suggested that the two-way radio assists them to socialise and confer with their students. However, Alan Gourley added the statement that 'informal contacts can be conducted quite well through the written word. In fact, I have known some students who are rather fearful of meeting their teachers lest their "illusions" be shattered.'

6.2.3.4 The impact of the two-way radio on overseeing student activities.

i. Identifying individual student's learning difficulties.

Most of the teacher/supervisors who responded to this question indicated that the radio assists them to identify individual student learning

weaknesses although some of them qualified their statement by indicating that these may be more apparent from the student's written work.

ii. Establishing the causes of poor student progress.

Ten of the teacher/supervisors felt that the radio allowed them to establish the causes of poor student progress more effectively than previously, and only one teacher/supervisor disagreed with the statement.

iii. Grading and evaluating students.

Nine of the teacher /supervisors felt that the two-way radio could assist them to grade students while five felt that it would not be useful for this function. John Zeevaarder indicated that if the session was structured to recapitulate the work covered in the past week, the radio could be used to evaluate their progress. One of the difficulties of grading written responses is the extent to which students rely on text books to compile them. Alick Ahern indicated that the radio enabled him to focus on specific aspects of student work and to find out if they really understand what they have written. Alan Gourley in rejecting the radio for this function felt that oral contact was too subject to giving the teacher an "impression" which could be misleading.

6.3 Impact of the two-way radio on student motivation and retention rates.

Only one of the teacher/supervisors felt that the radio was not motivating her students. She suggested that the students felt that they had fulfilled their weekly obligations when they spoke on the radio and they were late frequently in returning their assignments.

6.4 Nature of the educational content of the sessions and the importance of the following:

6.4.1 Giving and receiving information.

Virtually all the respondents considered the two-way radio is very important for this function although Alan Gourley suggested that the written

word is likely to be more accurate, more permanent and better researched.

6.4.2 Questioning.

Most of the respondents considered that this was the most important aspect of the two-way radio although two suggested that it was mainly the teacher who was asking the questions.

6.4.3 Exchanging opinions

This function is subject specific in that the responses from teachers of Legal Studies rated this function as being more important than the Mathematics teachers.

6.4.4 Problem solving.

All respondents considered that the device was satisfactory for this function although the responses tended to depend on the subject being taught. The Art teacher/supervisors indicated that some of their explanations required visual reinforcement as well as a verbal explanation.

6.4.5 Generating ideas.

Generally the teacher/supervisors felt that the two-way radio was less effective for generating ideas. The inability to break into a conversation is a constraint to this function.

6.4.6 Techniques such as role playing and brainstorming.

Although the two-way radio was very useful in this context in Legal Studies, the other respondents had not made use of it for these functions.

6.5 Impact of the two-way radio on learning processes.

6.5.1 Students' perceptions of learning stimuli.

Twelve of the teacher/supervisors felt that the discussion on the two-way radio would enable them to direct student attention to important stimuli. Helen Rabinovich, suggested that 'it becomes boring to learn a language only in its written form by correspondence and the radio allows me

to teach the oral aspect of the language'.

6.5.2 Concept structuring.

Generally, the respondents felt that the radio assisted the developments of concepts. Stephen Roberts indicated that the theoretical points of Accountancy 'can be better hammered out by this additional tool.'

6.5.3 Formation of attitudes

All of the respondents felt that the two-way radio system would have an impact on attitude formation. Alick Ahern commented that often rural students have only one particular point of view about an issue and the radio contact enables other issues to be introduced quickly.

6.5.4 Skills acquisition.

Only one of the respondents felt that the radio would not have an impact on skills. Several indicated that they would expect the obvious improvement in verbal skills such as discussion and debating.

6.6 Potential impact of the two-way radio on educational materials.

In the context of this trial where only a small number of students from each subject area have access to the radio, the teacher/supervisors have not made any modifications to their printed materials. Several indicated the magnitude of the task of modifying notes which require extensive planning. Alick Ahern indicated that if the radio was available to all students, he would be able to reduce his print materials by fifty percent and also reduce the reference reading which is presently demanded of correspondence students. Stephen Roberts indicated that he would be carefully considering the feedback he obtained from his student when he planned the course materials.

6.7 Impact of the two-way radio on preparation time.

The impact of the two-way radio on preparation time depends on the mode of use. Some teacher/supervisors simply respond to student questions while others prepare full lessons. Most of the respondents indicated that they require thirty to forty-five minutes preparation time to prepare for a two-way radio session. This may mean going back over a photocopy of the

students previous exercise and this is an added cost to the system. Several teacher/supervisors indicated that if the system was to be extended, some allowance would be required for additional preparation time.

6.8 Impact of the two-way radio on the nature of verbal exchanges.

6.8.1 The impact of the requirement to terminate each exchange with 'over'.

Ten of the respondents felt that this did not detract from the value of the system and five felt that it was a constraint. Margaret Ross drew attention to the time that can be wasted when a question is misinterpreted and several compared it with the ease of communicating by telephone.

6.8.2 Variation in the frequency of student exchanges over time.

Six respondents indicated that there had been no change in the level of student communication since they had been using the two-way radio and six felt that there had been an increase in student involvement.

6.8.3 Ability of students to handle information transmitted by the two-way radio.

Nine of the respondents indicated that the students handled the amount of information transmitted by the radio adequately.

6.9 Appropriate length of a session.

Table 16.
Suggested length of Each Session.

Length	Frequency of responses
10 minutes	4
15 "	1
20 "	2
25-30 "	5
40	1

6.10 Impact of the two-way radio system on the instructional skills of the teachers and the teacher/supervisors.

The system has had no direct or general impact on the instructional skills of the rural teachers. However, it appears to have had an impact on the skills of the teacher/supervisors from the Correspondence School. Although the evidence from the sessions which were coded is not extensive or conclusive, it does suggest that some teacher/supervisors are very skilled at asking questions which elicit responses from their students.

6.11 Impact of the two-way radio on the sharing of instructional skills between schools.

The two-way radio has had some impact on the sharing of instructional skills between the rural schools. Alan Marsland has used computers as an integral part of his Geography teaching and has a very good knowledge of their educational applications, he was able to take part in several meetings with teachers from the North-west using the two-way radio. Both in the two areas in this pilot project and in the Charlton pilot project, teachers have used the communication equipment to disseminate information about Computer Studies.

Both Eddie Pierce, the Commerce teacher at Sea Lake High School and Paul Shiel, the Level 12 teacher coordinator at Hopetoun High School suggested that the two-way radio may be useful for subject consultants who are based in regional offices. Because of the remoteness of the schools, consultants can only visit them once or twice a year. By having access to a two-way radio link, consultants and teachers may have regular audio links together and consultants may pass on information about resources and developments in their subjects.

6.12 Impact of the two-way radio system on student services such as career guidance.

The system probably has considerable potential for providing rural students with current information about career opportunities. Both Legal Studies teacher/supervisors have given their students additional careers information and details of tertiary courses.

6.13 The use of outside resources.

The two-way radio system has not been used to provide contact between

remote students and resources such as Level 12 examiners.

Chapter 7. Success of the Anticipated Goals.

7.1 The two pilot projects sought to improve the education of children studying in small isolated Victorian secondary schools by increasing interaction between a number of groups.

7.1.1 Between country schools with small classes, and correspondence students.

The system has not been used to link students taking correspondence courses to small classes in neighbouring schools. This is basically because these students are seen as the responsibility of the Correspondence School in Melbourne. However, the system is being used extensively to link correspondence students in the schools to their supervisor/teachers at the Correspondence School. At the beginning of 1983, the Principal of the Correspondence School requested staff to contact their students once a week using the two way radio. The correspondence students who were interviewed were in general, very enthusiastic about the contact with their supervisors through the two-way radio. One itinerant secondary student living with his family in the Mount Beauty area was able to contact his teacher/supervisors at the Correspondence School through the radio. Because of the availability of the two-way radio at Mount Beauty High School, the student began to attend the school on a regular basis for three days each week to complete his Correspondence School assignments. Although this is only an isolated instance involving one student, Penberthy has drawn attention to the increasing number of itinerant workers in Australia who are likely to rely on the Correspondence Schools for their childrens' education.(Penbarthy, 1982)

7.1.2 Between teachers in neighbouring schools.

While there is no interaction between teachers and their classes in neighbouring schools for instruction purposes, there has been a number of meetings. In the North-west district, the Country Education Project Computer Program Committee have held seven meetings, there has been one bus co-ordinators meeting, one Country Education Project Area Committee meeting and a small number of administrative meetings between teachers and

Principals. In the North-east district, a number of the staff in the three schools held conferences using the two-way radio in the following subject areas: English, Mathematics, Chemistry, Physics, Australian History, Commerce, and Legal Studies. The intention of these conferences was to discuss the use of the radio for linking small classes together in the three schools during 1983. There are several reasons why the two-way radio has not been used for instructional purposes by the small schools.

Communication technologies such as two-way radio, and other forms of teleconferencing are network technologies which shift the store of information from the teacher to resources beyond the confines of the classroom. This represents a threat to the existing role of the teacher. Pitts argues that currently, educational systems are structured on the basis of two resources, the teacher and the textbook, and new communication technology promises to change both. (Pitts, 1981, page 15). It is unlikely that there will be any significant change to greater co-operation between teachers in small rural schools until a new structure evolves for the delivery of education to remote schools. Currently, secondary teachers teaching small classes in rural schools develop a strong social relationship with their students. Some become very protective of their students and in general, they are prepared to expend considerable time and energy to ensure that 'their' students are not disadvantaged. They seem reluctant to extend this concern to students in other schools who they see with justification to be the responsibility of another teacher. The cluster concept of grouping a small number of schools together to share scarce resources is a structural change which may go part of the way to breaking down this attitude. Attitudes cannot be expected to change significantly in the short term regardless of the effectiveness of the equipment that is introduced into schools. Some teachers obviously do not see the need for closer contact with other classes in neighbouring schools given the present structure of the Victorian Education Department. It is also worth noting that while the schools in the trial may be loosely arranged in two groups on the basis of geographic proximity, Murrayville and Corryong High Schools are over 100 kilometres from their nearest neighbouring school.

There is the ever present problem of scheduling classes so that there is a common timetable between all schools. This is a common difficulty with

similar trials. Some Local Education Authority Superintendents in their assessments of the Tremperleau County one-way video, two-way audio project listed this as one of the difficulties. (Szymanski, 1981) In the current projects, schools have different starting times and one school, Murrayville High School has a ten minute silent reading time for all students and staff between 8.50am and 9.00am. This coincided with the general planning time when schools linked to each other to arrange common activities.

There is no doubt that this equipment is discomfoting to some teachers. They need the ability to be able to ask questions precisely and make succinct statements; to be able to ask questions that elicit a reply, and to involve all the people who are using the system. Jill Anderson, a Mathematics teacher/supervisor at the Correspondence School described the situation of students asking quite specific questions on subject matter which may not be currently familiar to the teacher/supervisor. There is pressure on the teacher/supervisor to use the time on the radio efficiently and this means that on-the-spot research to find the correct answer is more difficult than in a face-to-face classroom situation. The introduction of the two-way radio to the predominantly print dominated correspondence education has not turned correspondence instruction into traditional classroom instruction. Teaching with the two-way radio or any form of audio communication is a unique mode of instruction which requires considerable planning, attention to different techniques and the careful integration of supportive print materials. It is significant that a number of the teachers who were involved in the trial suggested the need for inservice education to give them the skills which are necessary to use this equipment successfully. As well as some concern over teaching techniques, one senior teacher indicated that some of the junior teachers in his school were reluctant to teach in a combined class situation using this equipment with senior teachers.

This type of communication equipment is more effective with subjects such as Languages and Legal Studies and less effective for subjects such as Art and Mathematics. Correspondence School teacher/supervisors of the latter group have commented on the desirability of having some visual display which they can ammend or supplement during the instruction.

The Correspondence School which has a well developed infrastructure for producing and distributing printed material to its students, and in every

session which was observed, the teacher/supervisor drew the student's attention to some printed materials. At present, small rural schools lack the infrastructure necessary to produce the type of materials that are necessary to support this technology.

It is equally obvious that there is a need for active co-ordinators for the project both within each of the schools and in each of the groups of schools. Part of the success of the Correspondence School is due to the work of Charles Bram in establishing contact with the eight schools.

7.1.3 Interaction between parents and teachers in country schools and correspondence school teachers.

While school councils are aware of the device in their schools and have agreed to purchase the transceivers at a reduced cost, the parent body as a whole are not involved in the use of the radio. Community organisations are not making any use of the facility although the regional representatives of the State Emergency Service attended one of the initial meetings in Ouyen to discuss their possible involvement in the pilot project. They believe that the system could provide a useful back-up communication network in times of emergency.

7.2 To pool resources available in country schools and the Correspondence School.

The two-way radio system is successful in linking the resources available in the Correspondence School with those in the small secondary schools. Although three of the rural Principals could not be interviewed, the other five Principals stressed the importance of the Correspondence School in providing additional curriculum choices for senior students in their schools. They feel that this increases the viability of their schools by encouraging senior students to stay on and complete Level 12 rather than enrol in a larger school in a distant provincial centre. Beechworth High School provides an interesting case study of the importance of offering Level 12 subjects in the school. From 1976-78 the school had difficulty sustaining Level 12 courses and did not offer any Science. Employment opportunities in the town were high and there was no incentive for students to continue. There was an emphasis on employing teachers at lower levels in the school.

Since 1978, the school has made a concerted effort to maintain Level 12 courses and broaden the Level 11 curriculum. Students taking a course by correspondence are provided with a teacher for three periods. The notion of a partnership between the Correspondence School and the small rural schools was also reinforced by the other Principals. Mr Don Lugg, Principal of the Correspondence Secondary School has also expressed enthusiasm for the two-way radio communication and has prepared a submission for funding to extend the system to other small Victorian rural secondary schools. He has also received requests from four other rural secondary schools to be included in the network.

7.3 To make better use of reasonably low cost communication technology.

Although this aim is difficult to evaluate, the economic aspects of two-way radio outlined in Chapter 8 suggest that the technology is relatively cost effective.

7.4 To introduce a visual link to support the audio link.

The intention of the North-east project is to supplement the audio link through the two-way radio with a visual link between computer graphic tablets in the three schools using the standard paired telephone lines. It was hoped that each tablet would operate like an electronic blackboard and enable teachers to communicate mathematical problems in a visual form to students in other schools. Discussions which occurred during an inservice day between a number of teachers and two Education Department computer consultants, Bill Davey and Arthur Tatnall, concluded that there were too many difficulties associated with this. After considerable discussion, it was decided to develop a data base of questions in subject areas which could be sent to each school on disk by post. Apart from Alan Marsland of Mt Beauty High School who circulated some biology questions in this format, this aspect of the trial has not been successful. This objective is too ambitious within the context of this trial. It is beyond the organisational resources of both the Country Education Project and the individual schools to achieve within the context of the other objectives, and it should become the objective of another trial..

Chapter 8. The Economic Aspects of the High Frequency Short-wave Two-way Radio System

The costs used in this analysis are based on the costs of providing the two-way radio transceivers in 1982. They are probably superseded and therefore do not represent firm quotations. Appendix F. contains a cost comparison of purchase and leasing of the equipment used in the trial.

8.1 Approximate capital and recurrent costs of establishing and operating a two-way radio system in one school for one year.

Table 17 provides a summary of the costs of establishing and operating a two-way radio in a school for one year.

TABLE 17.

Estimate of Capital and Recurrent Costs of Installing and Operating a High Frequency Short Wave Two-way Radio in One School for One Year.

Capital	\$	\$
Purchase and installation of transceiver. (estimate)	2,600	
Microphones	300	
Room conditioning costs (if necessary)	2,000	4,900
Recurrent		
Licence fee	35	
Depreciation of equipment (10%)	260	395

Discussion

Room conditioning costs are included in the estimate because of the wide variation in the standard of facilities found in country secondary schools and the uncertain availability of small relatively soundproof rooms. The sound from the unit is very intrusive and in certain locations such as Murrayville High School which is a newer design based on open planning, the use of the two-way radio has been disruptive to other classes. The location of the transceiver is also compromised to some extent by the location of the aerial. In the trial, use was made of existing school structures such as chimneys to attach one end of the aerial, and this partly determined the

location of the transceiver unit. If two-way radio communication with the Correspondence School is to become a permanent feature of small rural schools, some planning and modifications may be necessary to existing rooms. However, it is likely that a substantial amount of this work could be completed by voluntary labour and therefore the cost of room conditioning may be overstated in the estimates. Because of the location of the Correspondence School in central Melbourne, a landline has to be rented from Telecom Australia to take the signal from the transceiver to the transmitter at Glen Waverley, a Melbourne suburb. The estimated cost of this landline is \$2,500 per year.

The Country Education Project has allocated a further \$25,000 to upgrade the Correspondence School transceiver and relocate the transmitter in an area less subject to interference.

No attempt has been made to cost administrative charges for the additional time allocation given to staff for preparation and actual use of the two-way radio. During the trial, no time allocation was made to Correspondence Staff. As one staff member indicated, the time he spent on the radio with his two students was in theory deducted from the time he allocated in correction to his other students. Although the manner of use to the two-way radio has varied between staff members, the general consensus is that from 30-45 minutes is required for preparation. If this time is allocated, it would act as an incentive for staff to make more varied use of the facility.

8.2 Willingness of the schools to pay for the two-way radio system.

Seven of the eight schools in the trial have already purchased their transceivers from the Country Education Project at a reduced price. It is highly likely that if the project was to be extended to other schools in Victoria, school councils would be prepared to contribute towards the cost of the facility.

8.3 Conclusion.

The establishment costs of the two-way radio are not high relative to some other forms of communication technology and this form of communication has a relative cost advantage in terms of recurrent costs.

Chapter 9. Technical Aspects of the Two-way radio System.

As in any 'audio only' instructional system, the quality of the sound is critical. This depends upon the strength of the sound and the freedom from any interference.

9.1 The equipment used in the trials

The following equipment was used in the two trials:

Nine CODAN Type 7727 B SSB Transceivers.

Eight CODAN Type 7113 Power supplies.

External aerials

9.2 The strength of the receive signals.

The participants in the pilot projects indicated on a five point scale, the strength of the receive signals. A rating of five corresponded to a strong signal. The ratings for each school are averaged and summarised in Table 18.

TABLE 18.
Summary of the Monthly Mean Signal Strength Ratings from July 1982 to June 1983.

Month	Mean Monthly Ratings for Schools									
	Hopetoun	Manangatang	Murrayville	Ouyen	Sea Lake	Beechworth	Corryong	Mount Beauty	Corres	School
July 1982	-	-	3.9	4.5	4.7	-	-	-	-	
August	-	-	3.8	4.8	4.6	-	-	-	-	
September	-	-	3.8	4.9	4.4	-	-	-	4.0	
October	-	-	4.0	4.4	4.4	-	-	-	3.6	
November	-	-	3.5	4.0	4.5	-	-	4.0	4.7	
December	-	-	3.5	-	1.9	-	-	3.6	-	
February 1983	-	-	1.5	4.0	3.0	-	-	4.1	-	
March	-	-	4.5	4.0	2.5	5.0	4.0	-	4.8	
April	-	-	-	-	4.3	4.2	4.0	4.0	4.7	
May	-	-	-	-	4.5	2.5	3.5	2.5	4.0	
June	-	-	-	-	4.6	4.0	3.0	3.0	4.0	

Discussion

Not all schools kept complete details of the signal strength when they used the radio. However, there is some measure of agreement between the ratings from Murrayville, Ouyen and Sea Lake High School. They indicate that the strength of the signal declined in the December, February and March period. Victoria at this time was experiencing the most severe drought ever recorded and the north-west of the state in particular suffered from high temperatures, strong north winds and thick dust storms. Several entries during this period in the Sea Lake High School indicate that it was impossible to use the radio because of the weather conditions. Although the above table does not indicate this following information, entries in the logbooks from the three most frequent user schools suggest that the transmission conditions deteriorated markedly during the day. Most of the entries in each of the logbooks were recorded in the time period 8.15 am to 9.00 am. Consequently, they tend to be inflated as a typical day in the north-west last summer was usually calm until approximately 10 am, and then a strong north wind began to lift the dust. Overall, the signal strength ratings including those of the Correspondence School are generally satisfactory with the exception of the Summer months.

9.3 The clarity of receive signals.

This depends on the frequency range of the sound and the level of interference. The mean ratings for each school are summarised in Table 19.

TABLE 19.
Summary of the Monthly Mean Clarity of Speech Ratings from July 1982 to June 1983

Month	Mean Monthly Ratings for Schools									
	Hopetoun	Manangatang	Murrayville	Ouyen	Sea Lake	Beechworth	Corryong	Mount Beauty	Corres	School
July 1982	-	-	6.3	8.5	9.0	-	-	-	-	-
August	-	-	6.0	7.9	7.0	-	-	-	-	-
September	-	-	4.9	8.9	7.6	-	-	-	-	7.5
October	-	-	5.0	7.2	7.5	-	-	-	-	6.3
November	-	-	4.6	7.0	7.0	-	-	6.5	8.5	-
December	-	-	5.5	-	4.3	-	-	7.0	-	-
February 1983	-	-	1.5	5.0	5.5	-	-	6.5	-	-
March	-	-	9.0	7.5	4.6	5.0	7.6	-	7.0	-
April	-	-	-	-	8.0	4.5	6.0	7.0	6.6	-
May	-	-	-	-	8.5	3.0	5.0	-	7.0	-
June	-	-	-	-	8.1	4.5	5.0	7.0	6.8	-

Discussion.

Although there was some difference in the ratings given by the schools for clarity of speech, the three north-west high schools experienced a loss in speech clarity during the summer months.

9.4 Ease of use of the transceivers.

Because the transceiver is switched on with one switch, the system has been very accessible to students.. Consequently, a small group of students have become frequent users of the system before school commences and have derived considerable satisfaction from the social contacts they have made with other students. At one point, there was some evidence that students were forgetting that the system they were using was a broadcast medium and they were ignoring the conventions of the system.

9.5 Availability of service facilities.

One of the disadvantages with the system is the lack of qualified service centres close to the remote schools. Manangatang High School returned their set to Broken Hill for repair and were without it for approximately two months. As a general rule, minor faults can usually be repaired locally but serious faults mean that the machine has to be returned to the manufacturer in Adelaide in South Australia. Two schools, Ouyen and Beechworth have had a problem with feedback from the transceiver being picked up by the school intercommunication system and transmitted throughout the school during announcements. Beechworth corrected the fault locally by using coaxial cable between the bell switch and the amplifier of the school communication system. Mt Beauty High School had the additional problem of the two-way radio transmissions interfering with their television reception. This was caused by the radio antenna being erected close to the television antenna. The school overcame the problem by videotaping programs from another antenna at the other end of the school. This complication should be considered when aerials are being erected at schools.

9.6 Location of the transceivers within schools.

While the two-way radio is not as sensitive to extraneous noise as some communication systems, some Murrayville and Beechworth High School staff commented that the conversations plus the static being emitted by the radio was a nuisance. Obviously, some attention has to be given to the location of this system. Ideally, it should be relatively free from background noise to assist users to hear a weakened signal and it should not be located in a situation where it may disrupt other students or teachers.

Chapter 10. Conclusions and Recommendations.

10.1 Conclusions.

10.1.1 Frequency and type of use of the system.

In accordance with the main emphasis of the Country Education Project philosophy to direct its effort towards students studying in small isolated rural schools in Victoria, the preliminary inservice education days were held in the two rural areas. While it was hoped that the Correspondence School staff would use the two-way radio, it was anticipated that the main impact would be in the rural schools themselves. However, it is the Correspondence School which has emerged as the most frequent user of the two-way radio system. (Tables 2 & 3, Section 4.2, page 22) Teacher/supervisors of the Correspondence School have used the system on average, thirty-five to forty times a month during the period June to September, 1983. Most of the sessions have been on average, fifteen minutes long although some have extended to forty-five minutes. Corryong, Beechworth, Mt. Beauty and Murrayville High Schools have been the most frequent users of the system with the Correspondence School. (Table 3, Section 4.2, page 23) The subject areas which have been taught most with the system in terms of total minutes of use are French, Legal Studies, Politics, Italian and Art. (Table 5, Section 4.4, page 24) Teacher/supervisors of Mathematics and Science have also used the two-way radio successfully to teach and advise their students.

Both teachers and students from the eight small rural schools have used the system for a number of meetings and the Level 12 students from a number of schools have arranged subject based discussions. Some reasons have been suggested for the reluctance of the small schools to use the equipment to link small classes together for joint instruction, and for the relatively strong use of the Correspondence School. (Section 5.1.2, page 26) One of the most important appears to be the quality of the print materials which the Correspondence School produces and its effective distribution system. It is imperative that 'audio only' instruction be supported with reference to visual material.

10.1.2 Impact of the Two-way system on the interaction between teachers in neighbouring schools.

Although there has been some successful sharing of expertise between the teachers in relation to Computer Studies, the system has not been exploited to any great extent for this function. This is probably due to a considerable number of educational reasons such as time allocation and timetable schedules rather than anything intrinsic to the equipment. The objective to transfer data between the three North-east schools through microcomputer graphics tablets proved to be too ambitious for the resources of both the individual schools and the Country Education Project. The Principals and teachers interviewed in the schools were unanimous in claiming that the system had considerable potential for facilitating interaction between neighbouring schools. The biggest success of the system has been to give more immediacy to correspondence instruction and in the opinion of the majority of students and teacher/supervisors, to improve the educational effectiveness of this instruction.

10.1.3 Impact of the two-way radio communication on the academic achievement of students.

Although no formal experimental study could be undertaken to assess any change in educational achievement, the students felt that they had improved their understanding of the subject matter and that the audio contact had helped them understand difficult ideas quicker than they would have from printed notes. (Table 14, Section 7.1.1, page 44)

10.1.4 Impact of the two-way radio on the role and work schedule of the Correspondence School teacher/supervisor.

Although the impact on preparation time is partly determined by the manner in which the system is used, generally thirty to forty-five minutes is required for adequate preparation. (Section 7.1.2, page 45)

Teacher/participants suggested that the sessions should be ten to thirty minutes in length. Personal observation by the evaluator indicated that a considerable amount of dialogue can occur in a relatively short time. The system is information intensive and requires considerable concentration to be used effectively.

10.1.5 Impact of the system on the management of correspondence instruction.

The communication through the two-way radio has enhanced the advisory and problem solving roles of the teacher/supervisors. It has enabled them to deliver advice to their students almost when it is required rather than two to three weeks later. They have been able to question their students and determine the exact causes of any misunderstandings. The previous procedure often required the teacher/supervisor to write a long involved explanation about each student difficulty. While there is still a place for a written response, there is no doubt that the audio response can often save student and teacher/supervisor time.

10.1.6 Impact of the system on local curriculum development.

While the system has only had a marginal impact on curriculum development in Computer Studies, Principals and teachers from the schools believed that it had considerable potential for this function. Both Paul Shiel and Eddie Pierce, teachers of Hopetoun High School and Sea Lake High School respectively suggested that the system had potential for linking the small schools to curriculum consultants who are based at regional offices. Because of the large distances between towns, these consultants may only visit schools once or twice a year.

10.1.7 Economic aspects of the system.

The majority of the schools have decided to purchase the equipment which their students have used throughout the trial, and the Correspondence School has received enquiries from four other schools who wish to join the two-way radio network. The cost of establishing a transceiver in a school is approximately \$2,600. (Table 16, Section 8.1, page 54) Some minor differences can occur between schools because of installation variations. Recurrent costs are very low with maintenance and the annual licence fee of approximately \$25 being virtually the only expenditure. With such small recurrent costs, the system lends itself to considerable economies of scale when it is used more intensively than in the trial. No attempt has been made to compare the costs of the system with alternatives such as INWATTS where subscribers can make a trunk call for the cost of a local call. The organisation advertising the number is bulk billed for the calls.

In addition, no attempt has been made to assess the human costs of disrupted sound or the lack of privacy when using the system. These are factors which need to be considered when making decisions about appropriate communication technology.

10.1.8 Technical aspects of the system.

For most of the year, the signal strength of the system has been adequate and the speech clarity has been at an acceptable level. (Tables 17 & 18, Section 9.2 & 9.3, pages 56 & 58) However, there has been some decline in both these attributes in Summer months and during this period, there is evidence that the signal deteriorates throughout the day. One of the main advantages of the system is that it is "one button technology". That is, it can be activated by depressing one switch and this makes it very accessible to students. Generally, the equipment has been reliable although some faults have developed occasionally in some machines. This raises the possible difficulty of servicing serious breakdowns. These would require the transceiver to be returned to the manufacturer in South Australia and consequently, some long delays. The push button microphone operation while it is a constraint that has to be considered when using the equipment, has not detracted from the overall success of the communication.

10.1.9 Advantages and disadvantages of the system.

Clearly, the main advantages of the system lie with its use in correspondence education. It provides immediacy and speed of response personal contact for the teacher/supervisors with their students and oral practice and guidance for students of a foreign language. Although students learning a foreign language can listen to a cassette and practise pronunciation, it is extremely desirable that they do this with their teacher. While they may believe that they are duplicating the sounds on the tape, only a teacher can assess their accuracy. A further important advantage is the low recurrent cost of operating the system and the possible offsetting of a small amount of cost through better student retention rates and less print materials.

The main disadvantages of the system have been the poorer reception particularly at the Correspondence School, the different school timetables and scheduling, and the additional planning time which is required to operate the system effectively. An 'audio only' system is stressful for students during questioning sequences and some teacher/supervisors also indicated that they find the possibility of students asking a question on any aspect of the work without warning to be stressful with this equipment. (Table 6, Section 6.2.2, page 33) A further limitation of the system is its lack of provision for visual information. This is a constraint in subjects such as Art and to

a lesser extent, Mathematics.

10.1.10 Implementation of the system.

The implementation of a two-way radio system for the Correspondence School has not been considered in the main body of the report. However, the issue of additional frequencies will arise as the existing frequency may be inadequate to cope with demand.

10.2 Recommendations.

10.2.1 Planning and implementation.

Recommendation 1. It is recommended that the two-way radio system be extended over a period of three years to include the small schools listed in the Remote High Schools Study. (Remote High Schools Study, Appendix One, 1982) The sequence of installation should be determined by the Correspondence School in conjunction with the schools and regional administrations.

The system should be phased in over three years in order to give Correspondence School staff the time to integrate this technology into their instructional procedures.

Recommendation 2. It is recommended that Correspondence School teacher/supervisors and teachers in schools who use the two-way radio as an integral part of their instruction procedures be given a time allowance to compensate for preparation time and time using the system.

The two-way radio requires approximately thirty to forty-five minutes preparation time for each thirty minute session using it and this should be taken into consideration in allocating staff allotments.

Recommendation 3. It is recommended that Correspondence School teacher/supervisors be given inservice education of approximately one day prior to using the two-way radio for instruction purposes.

10.2.2 Technical.

Recommendation 4. It is recommended that investigations be made to determine

a list of possible service agents and qualified repairers of this equipment throughout Victoria.

Recommendation 5. That consideration be given to improving the quality of the Correspondence School reception by upgrading the quality of their transceiver.

10.2.3 Future Research.

Recommendation 6. It is recommended that the Country Education Project give consideration to a trial to utilise the two-way radio system to transmit text data between isolated schools and the Correspondence School and between small isolated rural secondary schools.

Recommendation 7. In order to achieve recommendation 5, it is recommended that the Correspondence School be funded to purchase a micro computer and the necessary peripheral equipment to enable it to participate in trials involving data transmission.

Recommendation 8. It is recommended that investigations continue into the feasibility of using 'electronic blackboards' to transmit text data between schools.

Recommendation 9. It is recommended that consideration be given to trials which involve the transmission of visual information as well as audio information.

10.3 Concluding remarks.

The gulf between the rural and the metropolitan cultures in Australia sometimes appears wider than any ethnic differences which might exist within the nation. Rural students contend with many of the disadvantages outlined by the Remote High Schools Study but in addition they may lack a sense of perspective of what they can achieve. They may be fearful of continuing their education at a tertiary institution in either one of the larger provincial centres or in Melbourne and all the disruption to their social life that this entails. They might opt for the relative security of their rural environment and terminate their formal education prematurely. Such a decision might be costly in the long run to both the individual and to society at large. The two-way radio system used in this pilot project has

brought a small group of rural secondary students in closer contact with their teacher/supervisors at the Correspondence School and with their peers in neighbourings schools and sometimes schools hundreds of kilometres apart. It has linked some of their teachers together to discuss recent developments in Computer Studies and it has provided these links at a reasonable cost and within an acceptable degree of clarity, consistency and reliability. It has gone part of the way to overcoming what might be termed 'the loneliness of the long distance learner'.

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APPENDIX A

List of Participants

Principal	Teachers	Students
North-east Victoria		
Mount Beauty High School		
Barbara Lipscombe	Alan Marsland	Fred Mouvet Yr.8 French Phebe Irwin Yr. 12 Art Julie O'Brien Yr.12 Art Karen Richardson Yr. 12 Legal Studies Camden Smith Yr.12 Politics Michael Arter Yr.12 general use
Corryong High School		
Mike Conroy	Brian Humphries	Faith Jephcott Yr.10 French Sheralee Wheeler Yr.10 French Denise Walton Yr.12 Art Janet Whitsed Yr.12 Art
Beechworth High School		
Trevor Rymes	John Meyer Ian Harrison	Michelle Ridgeway Yr.11 French Diane Smith Yr.12 General Mathematics John Ladson Yr.12 Pure Mathematics Rex Lucas Yr.12 " " " Cheryl McFeeters Yr.12 " " " Jennifer Leech Yr.12 Legal Studies
North-west		
Hopetoun High School		
Bruce Hotton	Peter Nutthal Paul Shiel	Tony Liston Yr.10 general use Jenny Afford Yr.12 general use Jeanette Bathgate Yr.12 " " Paul Edwards Yr.12 " " Cathy Jolly Yr.12 " " Brenda Hallan Yr.12 " " Bernard Moloney Yr.12 " " Kathryn Walsh Yr.12 " "
Manangatang Consolidated		
Kurt Forrer		Robyn Bowd Yr.9 Italian
Murrayville High School		
Jim Nunan	Bill Owen Neil Evans	Christine Gierus Yr.12 Legal Studies Isobel Hand Yr.12 " " " Raelee Heintze Yr.12 " " " Linda Kalms Yr.12 " " " Anne-Maree Marriage Yr.12 " "
Brett McLean Yr.12	" " "	
Ouyen High School		
Bob Ross	Chris Mitchell	

Sea Lake High School

Mike Nihill

Eddy Pierce
Alan Marshall

Terry Anderson Yr.12	general	use
Lindsay Broad Yr.12	"	"
Jodi Cox Yr.12	"	"
Geoff Elliot Yr.12	"	"
Judy Hender Yr.12	"	"
John Pinney Yr.12	"	"
Nicole Ryan Yr.12	"	"
Della Stacey Yr.12	"	"
Barry Trewin Yr.12	"	"

Correspondence School

Don Lugg

1982

Bruce Millar
Halina TaumanHistory
Applied Mathematics

1983

Alick Ahern	Legal Studies
Ms Anderson	Mathematics
Margaret Ashton	Needlecraft
Sam Bishay	French
Ms. Bouchier	Art
Charles Bram	Coordinator
Ms Donovan	Art
Carol Ford	Mathematics
Alan Gourley	History
Kevin Holland	English
Ms. Hausdorfer	History
Ms. Keck	Art
Ted Land	Legal Studies
Daryl Merton	Geography
Helen Rabinovich	French
Steve Roberts	Accounting
Margaret Ross	Pure Mathematics
Maureen Russell	Science
Joe Sutherland	Politics
Ms Vayner	General Maths
Maree Webb	Indonesian
Gwenda Whiter	Art
Beth Young	Italian
John Zeevaarder	French

MALLEE PROJECT LOG BOOK

Date	Time	Name of Person(s) using equipment	Name(s) of Person(s) contacted	Length of Contact	Receive Signal Strength	Clarity of Speech	Remarks (Subject matter, effectiveness, level of interference if any, problems, general satisfaction)
					0 weak 2 3 4 5 strong	0 poor 3 5 7 9 good	
84							85

APPENDIX B

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FOR CORRESPONDENCE STUDENT USE

Country Education Project Two-way Radio Evaluation.
Student Questionnaire.

Would you please complete this questionnaire. Most of the questions can be answered by drawing a circle around the number which indicates best your response. However, space will be left for further comments and you should feel free to write about all aspects of using the two-way radio in your studies.

NAME.....SCHOOL.....

FORM.....SUBJECT.....DATE.....

1. How frequent do you participate in discussion in an average face-to-face class.
- | |
|-----------------|
| Always |
| Very frequently |
| Sometimes |
| Occasionally |
| Never |
| 5 4 3 2 1 |

Please indicate the extent of your agreement with each of the following statements.

Strongly agree
Agree
Don't know
Disagree
Strongly disagree

2. I have improved my understanding of the subject matter as a result of using the two-way radio to talk to my supervisor.
- 5 4 3 2 1
3. I was able to ask questions and give answers easily during the session.
- 5 4 3 2 1
4. I have become more relaxed using the two-way radio as I have gained more experience with it.
- 5 4 3 2 1
5. I now feel more involved with the Correspondence School as a result of using the two-way radio.
- 5 4 3 2 1
6. The lack of privacy of the two-way radio made me hesitant to speak freely.
- 5 4 3 2 1

Strongly agree
 Agree
 Don't know
 Disagree
 Strongly disagree

- | | | | | | |
|--|---|---|---|---|---|
| 7. The need to constantly finish a statement with 'over' is a serious disadvantage with this technology. | 5 | 4 | 3 | 2 | 1 |
| 8. Getting used to this system is quite an effort. | 5 | 4 | 3 | 2 | 1 |
| 9. I was sometimes uncertain whether the person at the other end was listening. | 5 | 4 | 3 | 2 | 1 |
| 10. When someone at the other end spoke, it was always clear to whom he or she was speaking. | 5 | 4 | 3 | 2 | 1 |
| 11. I think that if I could see the supervisor, and see examples of the subject matter, the session would be improved. | 5 | 4 | 3 | 2 | 1 |
| 12. I had quite a bit of trouble knowing how the people at the other end were reacting to the things I said. | 5 | 4 | 3 | 2 | 1 |
| 13. I think that if we had all been in one room, I would have felt more comfortable. | 5 | 4 | 3 | 2 | 1 |
| 14. It was sometimes hard to react to things said at the other end because it was hard to interpret what was said. | 5 | 4 | 3 | 2 | 1 |
| 15. I consider that the social contact with other teachers and students was valuable. | 5 | 4 | 3 | 2 | 1 |
| 16. The system helped me gain an understanding of difficult ideas much quicker than I would have from written notes. | 5 | 4 | 3 | 2 | 1 |
| 17. I think that if two-way radio was available for all correspondence subjects, more students would enrol for them. | 5 | 4 | 3 | 2 | 1 |
| 18. I think that if two-way radio was available for all correspondence subjects, less students would 'drop out' during the year. | 5 | 4 | 3 | 2 | 1 |

Please indicate how valuable the following content was to your studies.

	Extremely valuable	Of some value	Undecided	Of little value	Of no value
19. Obtaining information about your recent performance on class sets.	5	4	3	2	1
20. Obtaining advice about new sets.	5	4	3	2	1
21. Obtaining general information about the course such as deadlines etc.	5	4	3	2	1
22. Being able to question your supervisor about more difficult aspects of your work.	5	4	3	2	1
23. Being questioned by the supervisor.	5	4	3	2	1
24. Being made aware of current developments in my subject area.	5	4	3	2	1

Please indicate the level of effectiveness of the system by circling the appropriate number.

	Extremely effective	Relatively effective	Of some value	Relatively ineffective	Extremely ineffective	Not Applicable
25. How effective is two-way radio relative to face-to-face teaching?	5	4	3	2	1	0
26. How effective is the two-way radio relative to face-to-face group student work?	5	4	3	2	1	0
27. How effective is the two-way radio relative to correspondence course learning solely from printed notes?	5	4	3	2	1	0

Other comments.

Please identify any issues from this session which you think are important to the evaluation of the teleconferencing system.

Thank you.

COUNTRY EDUCATION PROJECT TWO-WAY RADIO EVALUATION
TEACHER/SUPERVISOR QUESTIONNAIRE

Would you please complete this questionnaire as part of the evaluation of the two Country Education Project two-way radio trials. Your detailed comments and opinions will be most valuable to the evaluation.

1. NAME.....

2. Subject(s) supervised.....

3. Students supervised.....
.....
.....

4. Total number of years teaching.

less than 2 years	2-4	5-9	10-14	15-19	20-24	25-29	over 29 years
☐	☐	☐	☐	☐	☐	☐	☐

5. Total number of years in Correspondence School

less than 2 years	2-4	5-9	10-14	15-19	20-24	25-29	over 29 years
☐	☐	☐	☐	☐	☐	☐	☐

6. What is your attitude towards using devices such as two-way radio in education?

Extremely Favourable		Undecided		Extremely Unfavourable
5	4	3	2	1

Impact of the two-way radio on the supervision of student learning.

7. In what way has the two-way radio facility changed the way you have organised your work schedule?

.....
.....
.....
.....
.....
.....
.....

8. What impact has the two-way radio had on the flexibility of your instruction? That is, are you now able to pursue certain aspects of the course which may have been impossible previously, or do you feel that you are more able to vary the time allocation given to topics more easily with the radio?

.....

Impact of the two-way radio on your ability to advise students.

9. Do you feel that you have been able to emerge as a warm trusted person to your students when you use the two-way radio?

.....

Impact of the two-way radio on your ability to direct students towards the most effective learning activities.

10. Has the two-way radio helped you devise remedial activities for individual students?

.....

11. Have you found it easy to arouse student interest using the two-way radio?

.....

12. What is the effect of the two-way radio on students ability to work and think independently?

.....

13. How important have each of these components of the two-way radio sessions been?

Giving and receiving information

.....

Both you and your student(s) asking questions

.....

Exchanging opinions

.....

Problem solving

.....

Generating ideas

.....

Techniques such as role playing or brainstorming

.....

Socialising.

14. Has the two-way radio enabled you to conduct informal contacts in an open manner with your student(s)?

.....

Effect of the two-way radio on your ability to confer with you student(s)?

15. Have you been able to confer with your student(s) and provide positive advice using the two-way radio?

.....

Effect of the two-way radio on overseeing student activities.

16. Does the two-way radio system enable you to identify students' individual learning difficulties more effectively?

.....

17. Can you now establish the causes of poor student progress more effectively than previously?

.....

18. Will the verbal contact provided by the two-way radio enable you to grade and evaluate student progress more effectively?

.....

Impact of the two-way radio on the motivation of students.

19. Do you think that the student(s) you are supervising are more motivated towards their study as a result of using the two-way radio to contact you? Please give details

.....

Impact of the two-way radio on learning processes.

20. Will students' perceptions of learning stimuli be improved from access to the radio?

.....

21. Will the two-way radio assist students with concept structuring?

.....

22. Will the two-way radio assist students with the formation of attitudes?

.....

23. Will the two-way radio assist with skills acquisition?

.....

Impact of the two-way radio on didactic activities and materials?

24. Will the two-way radio require some modification in the printed materials you distribute to your students?

.....

Impact of the two-way radio on your level of preparation.

25. What preparation is necessary before you use the two-way radio?

.....

26. Does the amount of preparation necessary to use the system offset any advantages from its use?

.....

Impact of the two-way radio on the nature of verbal exchanges.

27. Has the requirement to terminate each exchange with "over" created an artificial formality which has detracted from the value of the system?

.....

28. Has there been a change over time in the number of exchanges originated by the student(s) using the two-way radio?

.....

29. Did the student(s) handle the amount of information transmitted by the two-way radio adequately?

.....

30. What is an appropriate length for two-way radio sessions?.....minutes

Your assessment of the value of the two-way radio system for the distribution of curriculum content and information.

31. Do you think that the two-way radio contact has helped your student(s) to increase their knowledge of the subject you teach/supervise?

.....

32. What are the main advantages of the two-way radio system?

.....

33. What are the main disadvantages of the two-way radio system?

.....

Other comments.

34. Please indicate any other issues which you think may be relevant to the evaluation of the two-way radio system.

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Thank you for your assistance,
Ian Conboy.

Evaluation of the Country Education Project Two-way Radio Trials.
Coding Sheet

Teacher/Supervisor.....

Date.....

Students involved in the
session.....

Nature of the verbal interaction	Frequency		Spontan- eity	Ease of comprehension
	Teacher/supervisor	Student		
Social interaction (non-subject specific)			5 Excell. 4 Good 3 Undec. 2 Poor 1 Nil	5. No repetition required 4. Some repetition required 3. Undecided. 2. Extensive repetition necessary. 1. Communication virtually incomprehensible.
Giving and receiving information				
1. about recent correspondence sets.				
2. about new sets.				
3. about new developments in subject.				
4. about course deadlines.etc				
5 other				
Questioning.				
1. student to teacher/ supervisor.				
2 teacher/supervisor to students.				
Generating new information through discussion.				
Problem solving. Teacher supervisor outlining a problem and inviting students to contribute solutions.				
Other activities. for example, role playing etc.				

Other comments.

Appendix F.

Summary of the Established Costs.

		LEASE	PURCHASE
Capital			
3 schools plus Correspondence			
School		13,815	18,740
Microphones		2,000	3,800
		15,815	22,540
Recurrent			
Licence Fees	1,350		
Landline rental	1,198		
Miscellaneous	1,500	4,048	4,048
Totals		\$19,863	\$26,588

(Country Education Project, 1982a. page 4)